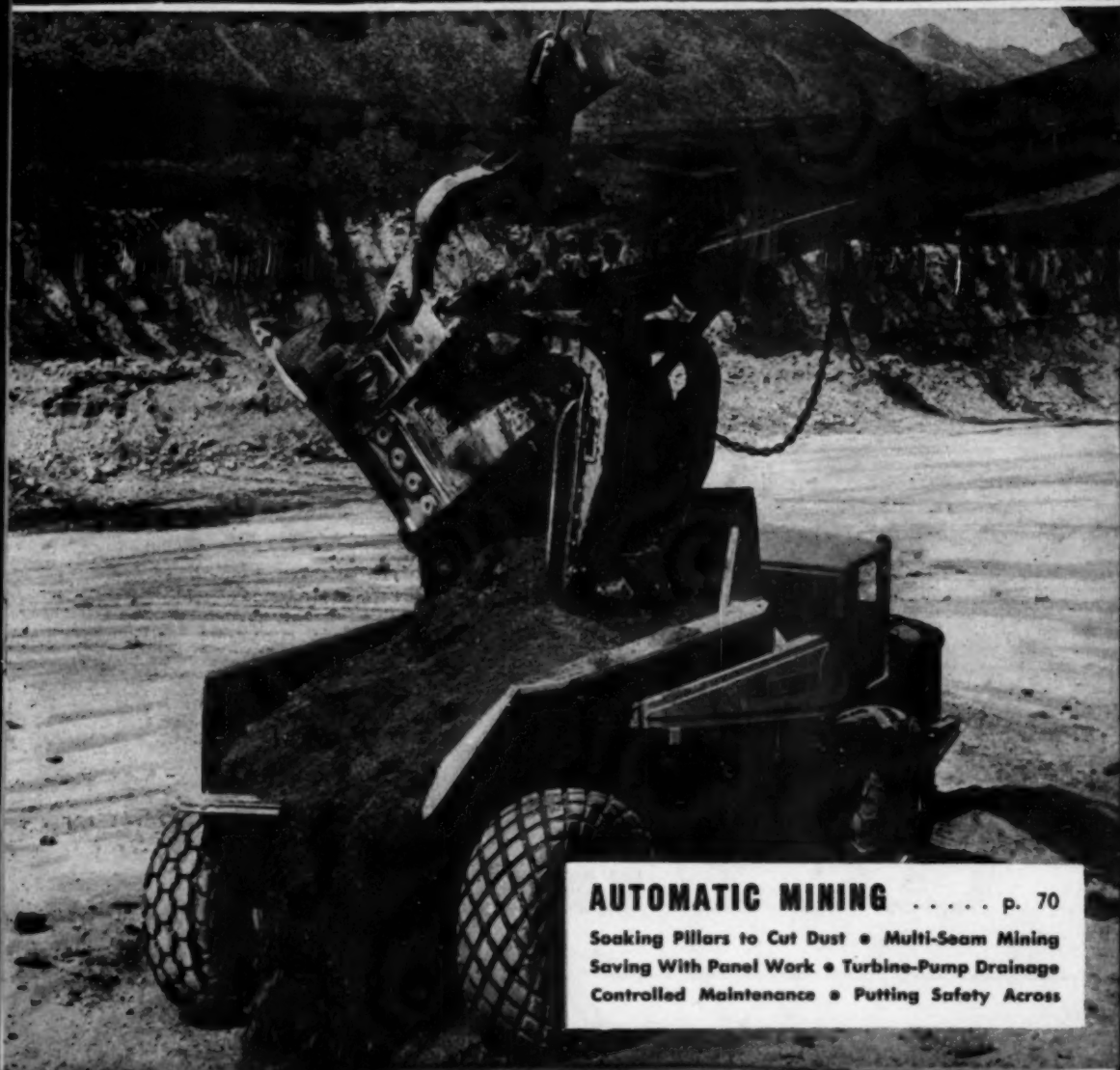


Coal Age



AUTOMATIC MINING p. 70

**Soaking Pillars to Cut Dust • Multi-Seam Mining
Saving With Panel Work • Turbine-Pump Drainage
Controlled Maintenance • Putting Safety Across**

**THE FOUNDATION FOR AMERICA'S
INCREASING PRODUCTION IS...**

MORE COAL



Rearmament needs, piled on top of record-level civilian needs, are beginning to place a great strain on America's productive capacity. For the policy is 'guns and butter'... 'satisfy both sets of needs'. And both needs *can* be satisfied by producing more basic industrial goods. More metal, more plastics, more textiles, more chemicals, more of everything... and they all take more coal!

Producing more is a typically American answer to a situation like this. Do it better—do it faster

—do it cheaper... it applies to coal as well as manufactured goods. In a mine it means—among other things—faster, cheaper, more reliable haulage. Q.C.F. Constant Haulage Mine Cars have proved the answer in hundreds of the country's most efficient and successful mines. They may answer your problems too—ask your nearby Q.C.F. Representative to explain. American Car and Foundry Company • New York • Chicago • St. Louis • Cleveland • Philadelphia • Washington • Huntington, W. Va. • San Francisco • Berwick, Pa.

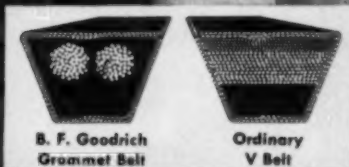
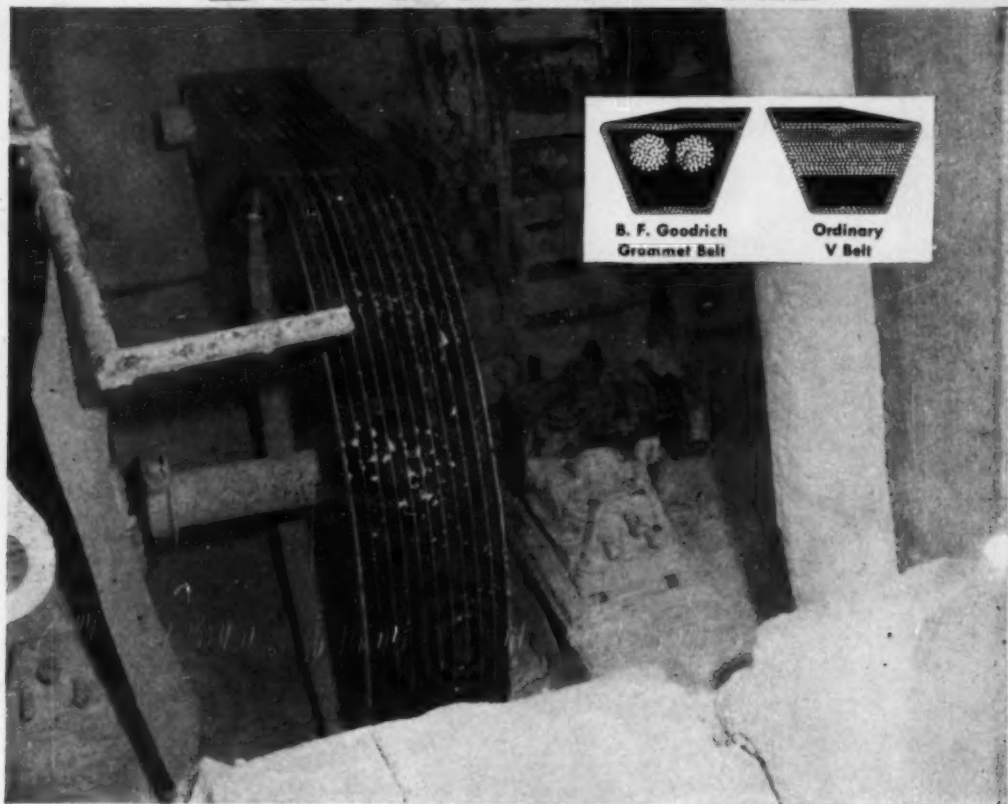
Q.C.F. MINE CARS

for Constant Haulage

RESEARCH KEEPS

B.F. Goodrich

FIRST IN RUBBER



Where a change to B. F. Goodrich grommet belts saved \$100 a week

B. F. Goodrich grommet V belts cut costs 20 to 50%

WHAT would you do if you were spending \$100 a week to replace failing V belts on one drive? That was the case in this mill — ordinary V belts failed in a week or less. They couldn't carry the terrific power load.

The company called in the BFG sales engineer and B.F. Goodrich grommet V belts were installed. That was 5 months ago and the grommet belts look as good today as the day they were installed. Here's why:

Endless — A grommet is endless, made by winding heavy cord on itself to form an endless loop. It has no overlapping cord sections. Because most of the failures in ordinary V belts

occur in the region where cords overlap, the endless grommet belt eliminates such failures.

Concentrated cord strength — All of the cord material in a B. F. Goodrich grommet belt is concentrated in twin grommets, positioned close to the driving faces of the pulley. No layers of cords to rub against one another and generate heat; cord and adhesion failures are reduced.

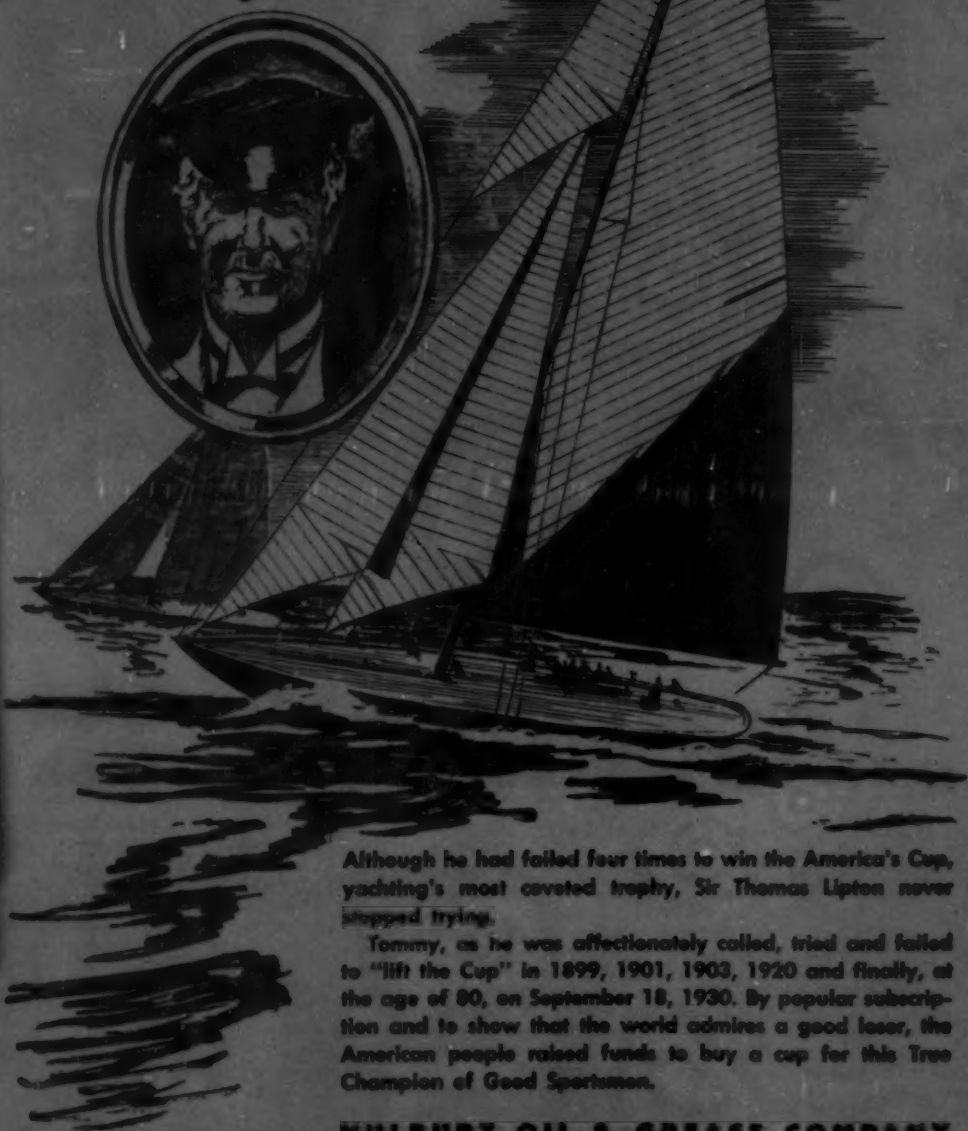
Better grip, less slip — Because a grommet is endless, a grommet belt is more flexible, grips the pulleys better. Size for size, grommet belts will give 1/3 more gripping power, pull heavier loads with a higher safety factor.

Only B. F. Goodrich has the grommet! — No other multiple-V belt is a grommet belt (U. S. Patent No. 2,233,294). Now available in C, D and E sections. See your local B. F. Goodrich distributor. Ask him to show you his "X-ray" belt that illustrates grommet construction clearly. The B. F. Goodrich Company, Industrial and General Products Division, Akron, Ohio.

Grommet Belts
BY
B.F. Goodrich
RUBBER FOR INDUSTRY

The Champion

Voted by America "CHAMPION SPORTSMAN"



Although he had failed four times to win the America's Cup, yachting's most coveted trophy, Sir Thomas Lipton never stopped trying.

Tommy, as he was affectionately called, tried and failed to "lift the Cup" in 1899, 1901, 1903, 1920 and finally, at the age of 80, on September 18, 1930. By popular subscription and to show that the world admires a good loser, the American people raised funds to buy a cup for this True Champion of Good Sportsmen.

HULBURY OIL & GREASE COMPANY
PHILADELPHIA, PA.

Specialists in Coal Mine Lubrication

The Champion

...IN COAL MINE LUBRICATION



Hulburt Quality
"The Champion" GREASE

It's all very well to be a good sport about being a game loser. But when you fall into FRICTION troubles in coal mining machinery—you can't afford NOT to be a winner! There's one sure way to win this constant contest between friction and smooth operation, and that's the use of HULBURT Quality Grease. Let a Hulburt Lubrication Engineer skipper the job, with his sound advice; and when you see how HULBURT GREASE minimizes lubrication troubles, by preventing them before they can start, your cup will "run over" with satisfaction.

WHEN YOU LOOK AT YOUR WASHED FINE COAL WHAT INTERESTS YOU MOST:

DRYNESS?

The Bird Coal Filter dewater fine coal to the very minimum of surface moisture that is possible to obtain by mechanical means.

RECOVERY EFFICIENCY?

The Bird Coal Filter assures complete recovery of cleaned fine coal. Only the high ash refuse is allowed to go to waste.

LOW COST?

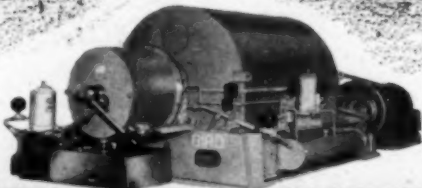
The Bird Coal Filter dries the fine coal at as little as five cents a ton, including operation, labor, power, amortization—the works. Bird Filter maintenance averages under 2 cents a ton, frequently less than 1 cent.

CLEAN WATER— NO DISPOSAL PROBLEM?

The Bird Coal Filter permits a closed water circuit. Bleeding of water from the system is no longer necessary.



Doesn't this justify a new look at your fine coal drying methods? For further details get in touch with



BIRD MACHINE COMPANY
SOUTH WALPOLE • MASSACHUSETTS



THIS MONTH'S COVER

BIG, EFFICIENT LOADING AND HAULING UNITS are proving themselves helpful allies in anthracite's search for minimum costs and maximum markets as the industry prepares to shoulder a bigger load for defense. The units in the cover picture are working on anthracite properties of J. Robert Basley, Inc.

COMING IN SEPTEMBER

UNDERGROUND AUGER MINING TESTS in an otherwise unminable 32-in seam show real promise at Consol (Ky.).

HOW ROOF-BOLTING permitted a change to mobile mining and a 50% boost in efficiency at the Hutchinson Coal Co.

FULL WORKING TIME for shovel and dragline was the goal in the latest modification of the "parallel-tandem" system of stripping pioneered by Maumee Collieries Co.

HOW MODERN EQUIPMENT and METHODS are teamed together for an output of 40 to 50 tons per man-day at the face at the Lida B mine of the Franklin County Coal Corp.

ELECTRICAL SAFETY UNDERGROUND—A coal company electrical expert outlines the hazards and tells you what can be done about them.

HOW A NEW DRUM-TYPE HEAVY-MEDIA VESSEL is profitably producing standard anthracite from banks containing refuse running as high as 85%.

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EVERY CAR EASIER....

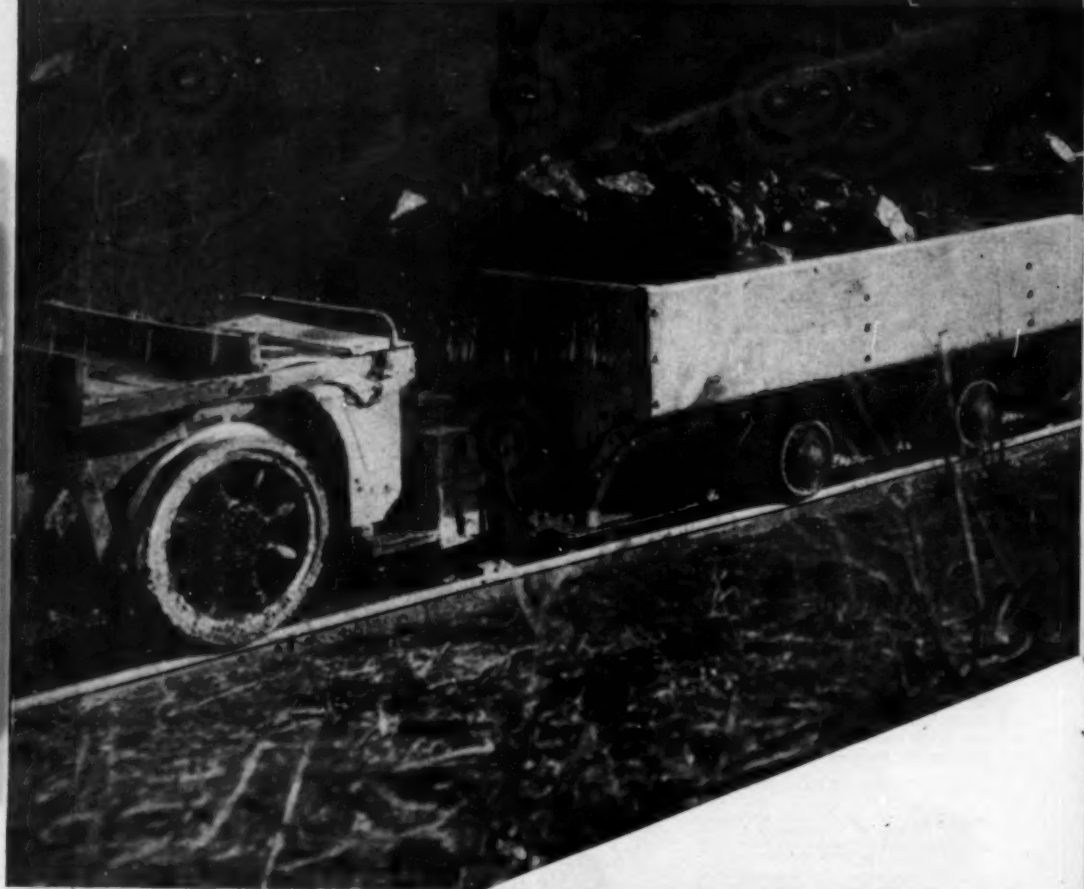



Photo Courtesy
American Car and Foundry Co.



TEXACO LUBRICANTS

STARTS

when wheels are lubricated
with **TEXACO OLYMPIAN GREASE**



Your cars get off to easy, power-saving starts, even at *winter* temperatures, when lubricated with *Texaco Olympian Grease*. Results are the same whether bearings are plain, cavity hub or anti-friction. In addition, bearings get the full protection that means longer life and lower maintenance costs.

Texaco Olympian Grease stays in the bearings, sealing out dirt and moisture. It resists oxidation and separation in both service and storage . . . provides long-lasting protection against wear. There are three consistencies of *Texaco Olympian Grease*, meeting all requirements.

To keep your hydraulic mechanisms from unscheduled stoppages, use *Texaco Regal Oils (R&O)*. These turbine-quality hydraulic oils keep systems free of rust, sludge and foam . . . assure smoother operation . . . prolong pump life and reduce maintenance costs.

A Texaco Lubrication Engineer will gladly help you simplify lubrication and reduce costs throughout your mine. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

☆ ☆ ☆

The Texas Company, 135 East 42nd Street,
New York 17, N. Y.

For the Coal Mining Industry

They did ...

HOW these results were produced is the core of this story. CW&F came to us with a question on *method*—not for quotations on a device.

what ...

The answer was worked out with Nordberg and the CW&F engineers by our staff. They attacked the problem as a whole ... and put together an *integrated* electrical and mechanical system of many devices.

you can do ...

This method works for every mining process. In any electrical project, the devices themselves are secondary ... it's how they're put together that counts.


to produce more

Developing integrated electrical systems that make mining more productive has been one of our major activities for 50 years. Your Westinghouse office is a good place to go when you have a job for electricity.



The Rototrol Regulator used on modern hoists gives smoother, faster and more trouble-free operation than previous control systems.

The story behind the *World's* *Record-holding Hoist*



Twenty-seven years ago the Chicago, Wilmington & Franklin Coal Company had a certain problem. How they solved it has a bearing on a number of problems you probably have today. CW&F president George B. Harrington tells the story:

"Astonishingly trouble-free operation"

"In 1923 my company decided to open one big new mine, instead of what would have become two good-sized operations. This decision raised a problem however—whether one hoist could lift more than 12,000 tons per shift the necessary 600 feet. After many slide-rule hours and with prayerful acquiescence on our part, we installed a combination of Westinghouse equipment and Nordberg hoist—new and exceptional in design. It has given astonishingly trouble-free operation ever since."

Never a major repair, none contemplated

In 1928 this hoist made the world's coal hoisting record—15,175 tons in one 8-hour shift. Yet the hoist has never required a major repair—and none is contemplated now. The motors and generators have their original windings, bearings and commutators. At no time in 27 years has a failure of this equipment caused lost production.

New Westinghouse equipment is even better

Westinghouse keeps close to mining problems and new hoist drives are even better than this record holder. Some new ones are completely automatic; don't need an operator at all. Rototrol® control is now used. It needs less maintenance and results in smoother operation.

Call Westinghouse early on every job

These results are typical of the performance Westinghouse builds into *all* electrical equipment for mining. When you're planning *any* new project, call in Westinghouse early. J-94698

YOU CAN BE SURE... IF IT'S

Westinghouse

**EQUIPMENT FOR
MINING**

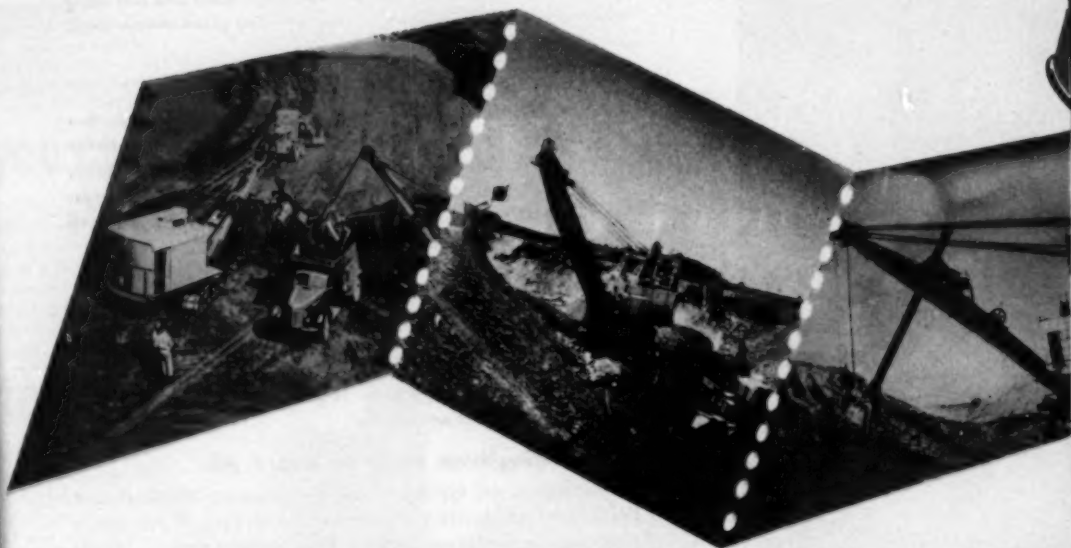


LONGER ENGINE LIFE

because this lubricating oil also

CLEANS ENGINES

— and keeps them clean!



▶ No more lacquering of pistons, cylinders, valves, with TENOL.

▶ TENOL keeps valves and rings from sticking.

▶ TENOL prevents clogging of oil pump screens and oil channels.

▶ With TENOL, engines stay clean — free from harmful sludge and carbon.

▶ TENOL does not thin out at high temperatures, flows freely at low temperatures.

▶ Low oil consumption with full power, with TENOL.

▶ TENOL prevents corrosive wear of bearings and other parts.

▶ TENOL eliminates foaming.

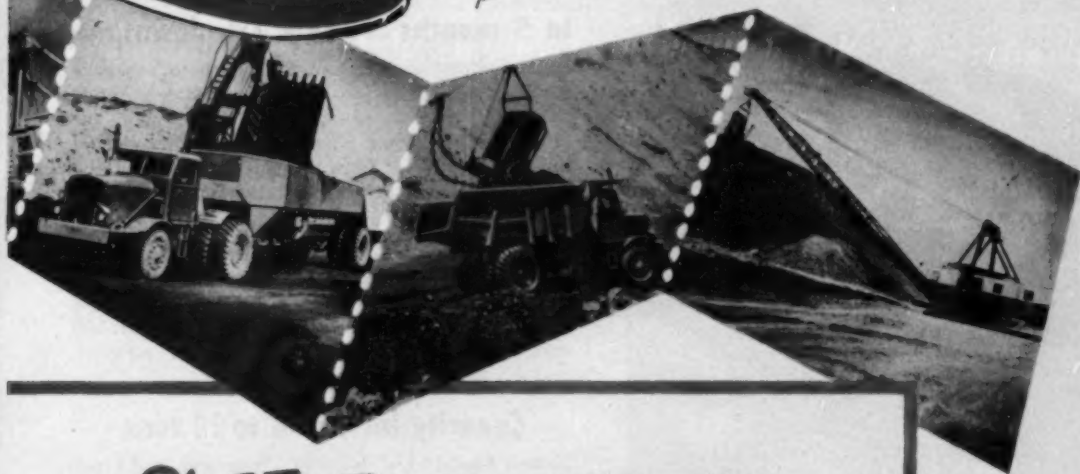


*Available
in 55 gallon
drums and
5 gallon
containers*

► For over 15 years... in all types of diesel and gasoline engines in rugged, heavy-duty service... Sinclair TENOL® has been doing an outstanding job. TENOL has proven it provides long periods of trouble-free operation at sustained high power output, with lowered upkeep costs.

Sinclair TENOL is not to be compared with many alleged "heavy-duty" oils. TENOL is the real thing! You can easily tell if an oil is actually "heavy-duty"... See if it is approved under new Military Specification MIL-O-2104. TENOL far surpasses this stringent Government standard!

Save your valuable equipment—phone your nearest Sinclair Representative or write direct to Sinclair Refining Company, 630 Fifth Ave., New York 20, N. Y.



SINCLAIR TENOL
prolongs engine life

J. Robert Bazley

boosts with



Big 12' 6" x 8' top-spooling speeds shovel action, reduces spillage. Bazley's 4-yd. stripping shovel heaps 15 bank yards of sand and clay into Tournarocker body in 3½ to 5 minutes, depending on bank conditions.

Stripping 3,000,000 cubic yards of sand, clay and rock from anthracite coal deposits at Mt. Carmel, Pennsylvania, J. Robert Bazley, Inc. of Pottsville has been using 3 rear-dump C Tournarockers for nearly a year to haul from a 4-yard stripping shovel.

Complete 4200' cycle in 7.4 minutes

Tournarockers are loaded in an average of 3 to 4 passes from the well-heaped dipper . . . carry 15 bank yards per trip. Checked on a typical 4200' cycle, each 16-ton rig averaged a round trip every 7.4 minutes . . . including 3.6 min. to load, 0.3 min. to dump, and 3.5 min. for haul and return. Conventional dump trucks of smaller capacity, loaded by the same shovel and traveling over the same haul road, averaged 7.9 minutes for the same cycle.

In 5 months . . . only 7% downtime

In 2,000 hours of operation, the Tournarockers have maintained a 93% job efficiency record. "We're particularly impressed with the clean dump, the safety when the rear wheels are over the edge of the dump, and the extreme maneuverability of the units," says J. Robert Bazley, Company President.

In addition to these 3 LeTourneau rear-dumps, Bazley also is working 2 of the same C Tournapull prime movers with 16-ton Carryall Scrapers at the Mt. Carmel mine. These 186 h.p., electric-control prime movers are also interchangeable with flat-bed and bottom-dump haulers, as well as on scrapers, rear-dumps and other equipment.

Capacity increased to 18 tons

Newest Model "Cs" have 12½% greater load capacity than machines described here. Both the New C Tournarockers and C Tournapulls now carry 18 tons instead of 16. Ask your LeTourneau Distributor about them . . . or write TODAY.



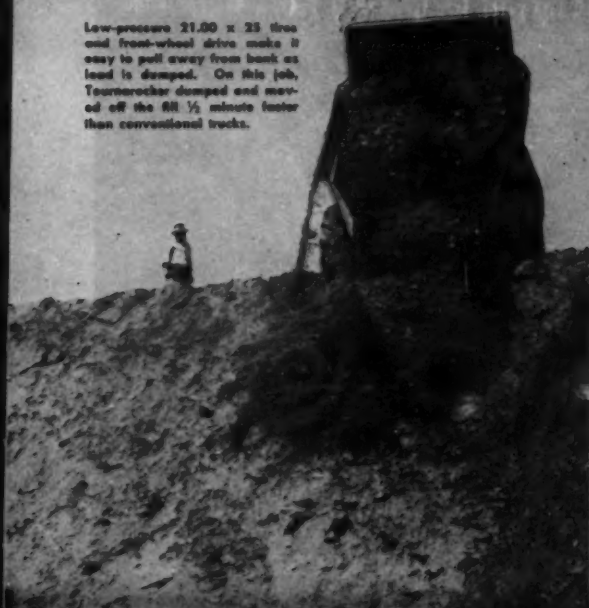
Mail today to: R. G. LeTOURNEAU, INC., Peoria, Ill. for more information on 35 m.p.h.

NAME.....	TITLE.....	C Tournapull for use with:
COMPANY.....		<input type="checkbox"/> 17 cu. yd., rear-dump Tournarocker
STREET.....		<input type="checkbox"/> 13.5 cu. yd. Carryall Scraper
CITY.....	STATE.....	<input type="checkbox"/> 15 cu. yd., bottom-dump
Type of work handled.....		<input type="checkbox"/> Tournahopper

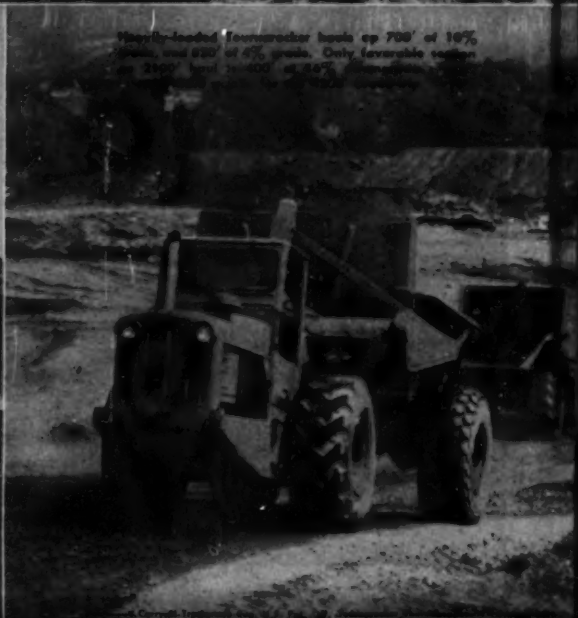
strip production *3 "C" TOURNAROCKERS*



Low-pressure 21.00 x 23 tires and front-wheel drive make it easy to pull away from bank as load is dumped. On this job, Tournarocker dumped and moved off the fill 1/2 minute faster than conventional trucks.



Heavily-loaded Tournarocker hauls up 700' at 10% grade, and 800' at 4% grade. Only favorable section on 2100' haul hauls at 20% grade.



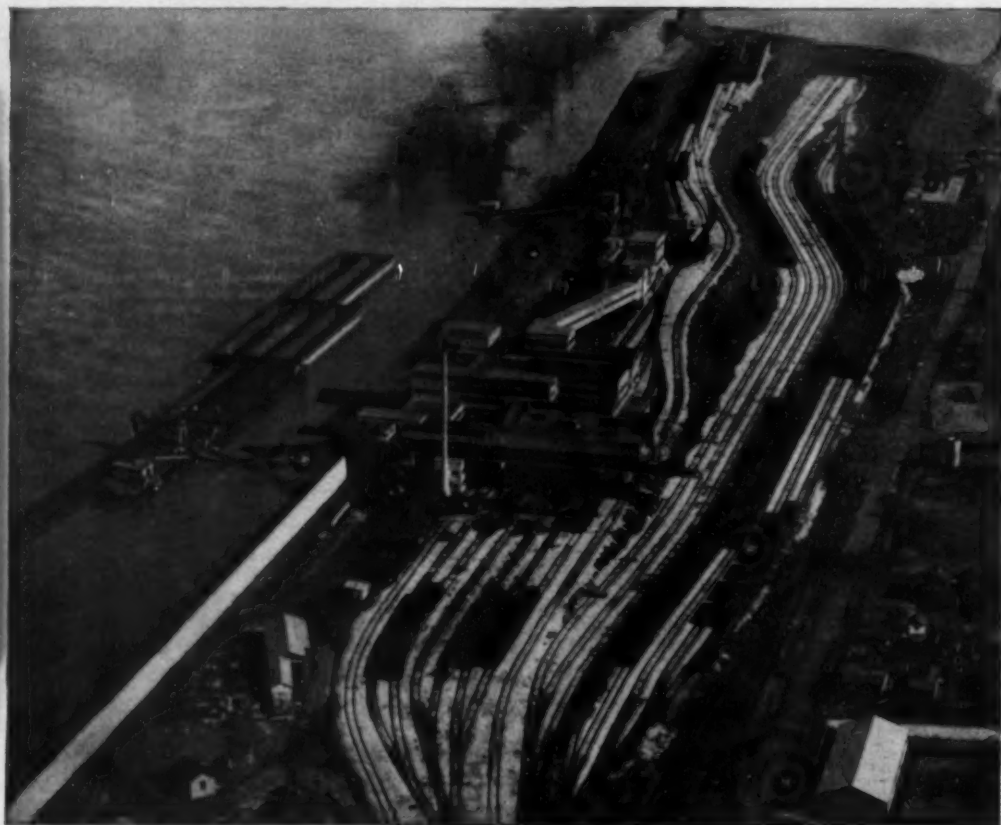
LETOURNEAU *TOURNAROCKERS*
PEORIA, ILLINOIS

HIGH SPEED on RUBBER PLUS TRACTION ADVANTAGES of a CRAWLER

New river-loading plant cleans 800 tph of coal with help of G-E drives!

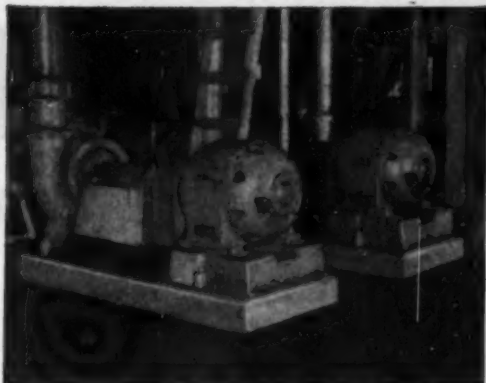
At the rate of 800 tons per hour, Truax-Truax's central Canada plant prepares high-grade metallurgical and steam coal from the company's mines as far as 80 miles away. Completed in January 1950,

it utilizes a unique barge-loading plant with retractable belt conveyor (shown at left) which permits automatic loading of barges regardless of wide fluctuations in river level.



GENERAL  ELECTRIC

Truax-Traer Coal Company's Ceredo, W. Va., preparation plant—loading automatically to both river and rail relies on General Electric motors and control for stay-on-the-job dependability



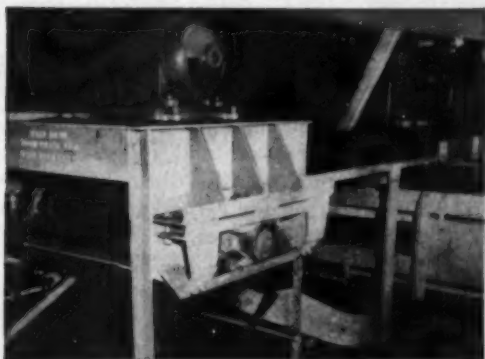
2 Flow of coal through the plant is maintained by electrified equipment driven largely by G-E motors, which account for almost all the plant's connected 4858 hp. Here are two of five G-E Tri-Clad® open (dripproof) 125-hp motors driving recirculating pumps that supply launders and wash boxes.



3 Centralized control for groups of motors in various sections of the plant is provided by eight G-E Cabinetrol® assemblies (one shown). These units, metal-enclosed for personnel protection and individual circuit isolation, come ready for quick installation.



4 More efficient use of manpower is made possible at the Ceredo plant by the use of this master control desk. It combines all 82 G-E push buttons and indicating lights in one location, thereby closely coordinating plant operations with minimum effort.



5 From rotary dumps to loading booms, plant's equipment is kept "on the go" by G-E Tri-Clad motors—triple protected against physical damage, electrical breakdown, and operating wear and tear. This Tri-Clad motor drives one of five rail loading boom conveyors.

* Registered trade mark of General Electric Co.



DRIVES
for
COAL PREPARATION PLANTS
—to cut clean-coal costs!

6 "Electrified coal preparation," a 32-page photo-report, shows how modern coal preparation plants are applying electrified machinery to increase clean-coal output, reduce coal-processing costs. Ask your G-E representative about it, or write for Bulletin GEA-5308. General Electric Company, Schenectady 5, N. Y.

GET LONGER CARBIDE

more coal per tool at

A few of many valuable principles of mining-tool care that your men can learn at the Carboloy Customer Training School or from our technical literature.



1 Use only silicon carbide wheel to grind the carbide tip. This will avoid checking and cracking of carbide.



2 Use only aluminum oxide wheel to grind steel shank. (Silicon carbide wheel would glaze and load.)



3 Grinding before bit is worn too far makes sharpening easier and faster, gives longer tool life.



4 Using bit when it's worn too far requires more power, puts heavy burden on mining machine, wastes carbide.



5 Set tool to shortest practical gauge. Excessive gauge setting causes tool to bend and break.



6 Don't hammer carbide tip when breaking tool loose from auger.

With the right care, Carboloy Coal Mining Tools will work on and on—cut coal for you more economically, more efficiently, ton after ton after other tools give out.

Use these **FREE** Carboloy Customer Services

To help your men learn the proper maintenance, grinding, and general care of carbide coal mining tools, the Carboloy organization has established a comprehensive service program that includes:

- 1) A clear, concise maintenance instruction manual—Catalog CM-100.
- 2) The assistance and advice of Field Engineers and your local distributor.
- 3) A complete training course for your key personnel.

The tuition-free course offers a program of instruction in correct grinding practice with demonstrations and individual work, provision for discussing with your men the carbide tool problems of your company.

Write For Information

For uniform, high-quality Carboloy Coal Mining Tools and more information about the company's cost-cutting, life-lengthening tool conservation services, see your nearest Authorized Carboloy Distributor. Or write direct.

MINING-TOOL LIFE — lower tool cost per ton

Carboloy Coal Mining Tools — made of Carboloy Cemented Carbide, hardest metal made by man — are lab-designed, mine-proved for freer, faster cutting. Uniform, high-quality inserts assure longer bit life through heavy use and many, many regrinds.

Improved Roof Bolting Drills



TWO-PRONG TYPE

For drilling through softer rock, such as shale, bony and laminated sandstone. Available in two sizes—1 1/4" and 1 3/8". Rugged double prongs tipped with Carboloy Cemented Carbide assure longer drilling life. Exclusive Carboloy design achieves maximum efficiency.



SOLID TYPE—For faster, easier drilling in hard slate, hard shale, laminated limestone, and massive sandstone. Sizes 1 1/4" and 1 3/8". Tipped with Carboloy Cemented Carbide—the hardest metal made by man—to give maximum speed in roof drilling. Develops faster rotary drilling speed than pneumatic methods. Improved flute design to remove cuttings faster; alloy steel body for greater strength.

Improved FINGER BIT—For strip, underground mining • Perfect for use in hard-to-take-hold-of medium ground • Real gouging action; fits all standard auger drill heads using 1/2" bits. Other plus features: Faster cutting due to larger clearance angle on shank • Drills more freely • Less pressure required • Uniform high quality throughout entire tip • Alloy steel shank, heat-treated.

Improved AUGER DRILL BIT—For post mounted and push drilled. Now available in size 1 1/2", as well as 1 1/4", 2", 2 1/4". Check these quality features: Maximum clearance and relief angles permit freer, faster cutting. • Improved spiral prevents packing of coal cuttings • Uniform high-quality carbide throughout entire tip assures longer bit life • Long tips of Carboloy cemented carbide permit many more regrinds • Forged alloy steel shank.

MINING MACHINE BIT—Eight important advantages: Shank level with insert for free flow of coal • Less shank steel to grind, yet adequate insert support • Less carbide to grind; faster grinding, greater tip economy • Smaller point for less power consumption • No shoulders; set to any gauge size within range of uses • Maximum hold through combination of braze and mechanical holding • Approximately 50% greater thickness of insert at cutting edge • Alloy steel shank, heat-treated to maximum physical strength; permits set screw clamping.

CARBOLOY

DEPARTMENT OF GENERAL ELECTRIC COMPANY
11120 E. 8 MILE STREET, DETROIT 32, MICHIGAN

"Carboloy" is the trademark for the products of Carboloy Department of General Electric Company

Specify

CARBOLOY

THE QUALITY BRAND OF COAL MINING TOOLS



His Records Prove It's Good Wire Rope

This man knows that his Bethlehem rope is giving him a good return on every dollar it cost him.

He isn't just guessing. He keeps records on the doings of all his wire ropes; figures that tell him the date they go to work, how much they accomplish, and when they're replaced. From his figures he can see which brand is *doing the most* for him over a period of time. He doesn't rely on general impressions or rough estimates. He *knows*!

Bethlehem urges that all users of wire rope do likewise—keep records of wire rope performance, expressed in units of work. How many ton-miles a rope accounts for; how many yards of rock it moves,

how many cars of coal it hauls up a slope, etc. By doing so, the user can compare one brand against another; see for himself which brand is costing him the *least* for the actual work it does.

We know that in any such comparisons, Bethlehem wire rope will prove an outstanding value. Stack it against the field; keep your own figures. They'll tell you, in black and white, that a dollar invested in Bethlehem rope buys a mighty big dollar's worth of service.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

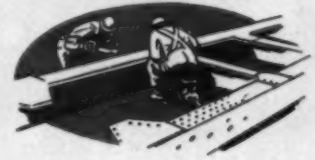
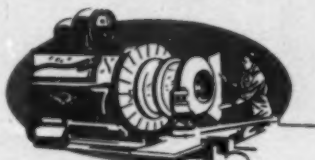


**LET YOUR RECORDS
TELL YOU!**



"It ain't the individual nor the army as a whole
But the everlastin' teamwork of every bloomin' soul."

Excerpt from "Cooperation"
by J. Mason Knox



When a contract is awarded to Heyl & Patterson for Heavy Bulk Materials Handling Equipment every member of the H & P organization "Gets Into the Act."

Heyl & Patterson's ability to do the **WHOLE JOB**, with their own forces, All The Way from Design to Erection until the apparatus is performing satisfactorily, has earned the respect and confidence of our customers in the Mining, Steel, Power, Railroad and Aluminum industries.

Heyl & Patterson can guarantee "**CONTROLLED QUALITY**" because we have **OUR OWN** Engineering Department, **OUR OWN** Fabricating Plant and **OUR OWN** Erection Department.

Since 1887 the economic value of H & P "**CONTROLLED QUALITY**" has been demonstrated by the performance records of Heavy Bulk Materials Handling Equipment, designed, fabricated and erected by Heyl & Patterson.

Every **NEW** Contract is a **NEW** Challenge not only to H & P Engineers but to every person in our fabricating Plant and in our Erection Department.

The **WHOLE JOB HAS TO BE RIGHT**. This is the H & P Policy that governs every step of the way from the first consultation with a customer until the **WHOLE JOB IS IN SUCCESSFUL OPERATION**.

Ore Bridges
Railroad Car Dumpers
High Lift-Turnover-Rotary
Coal Preparation Plants
Coal & Coke Handling Equipment

Boat Loaders and Unloaders
Rotary Mine Car Dumpers
Coal Crushers
Coal Storage Bridges
Car Hoists and Boat Movers

Bradford Breakers
Refuse Disposal Cars
Thorsten Coal Sampling
Systems
Kinney Car Unloaders

Pig Iron Casting Machines
Cyclone Thickeners
Thermal Dryers
The Drying Dutchman
Reineveld Centrifugal Dryer

Heyl + Patterson, Inc.
"SINCE 1887"

55 WATER STREET • PITTSBURGH 22, PA.

**Heavy Bulk Materials
Handling Equipment**
**All The Way from
Design to Erection**

Mechanical soldiers need good shoes, too!

THESE are days of grave concerns . . . of conservation and mobilization for strengthening the nation's defense—for the survival of our national economy—for the continuance of our dependence upon our tremendous coal reserves—for the keeping of every home-front machine in condition to stay on the job until its replacement again becomes a normal procedure.

That includes *your* equipment and emphasizes *your* responsibilities. To benefit fully from the productive life that has been built into your "Caterpillar" equipment, you must be alert to its needs as time and hard usage take their toll in wear and depreciation. For instance:

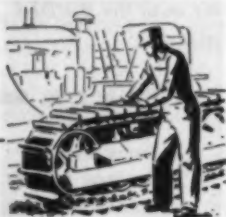
How are your "Caterpillar" track shoes?

Tough as they are, they can't battle rocks, shale, jolts and grinds forever. Growing shortages in the premium steels that go into them may make early replacements difficult—and extra care of track parts something to think about.

CATERPILLAR, PEORIA, ILLINOIS



DO
THIS
NOW



YOU'RE THE DOCTOR. Check those sprockets, grousers, rollers, idlers, pins, links and bushings. Proper track adjustment minimizes wear. Sprockets may need switching from side to side, and pins and bushings need turning, to provide new wearing surfaces. Shoes serve longer if you have worn grousers built up before excessive wear occurs.

Reread your Operator's Instruction Book. Anticipate your future parts requirements. Take the facts to your "Caterpillar" dealer. His modern facilities and skilled servicemen are at your disposal. He can rebuild many parts to keep your machines on the job. Their added life will repay the reconditioning cost over and over.

CATERPILLAR

REG. U. S. PAT. OFF.

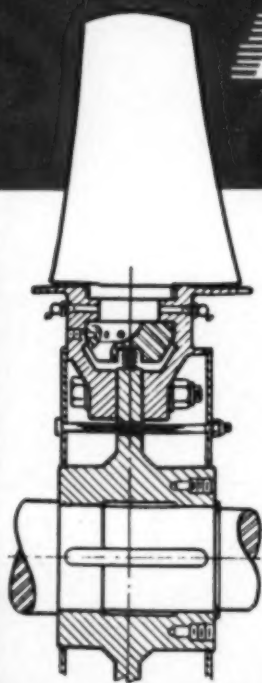
DIESEL ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT



IT'S
EASY



TO CHANGE BLADE POSITIONS
ON THE
JEFFREY
AERODYNE
MINE FAN



Easy blade adjustment is one of the important features of the Jeffrey AERODYNE Fan. The rotor is assembled with 12 blades designed for *individual* adjustment. Positive, accurate adjustment is made by removing one set screw in each blade, rotating the blade to desired position and re-inserting the set screw.

Ease of changing position is facilitated by providing stainless steel thread inserts in each screw hole of the socket, plus the use of rust-proof set screws. In addition, lubrication fittings are supplied on both halves of the socket to eliminate seizure between the blade and socket due to corrosion and dirt particles getting into space between blades and sockets. A large number of positions are available for an extremely wide range of operation.

Consult a Jeffrey Engineer both on fan and blower applications for your mine.

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WHEREVER COAL IS MINED YOU



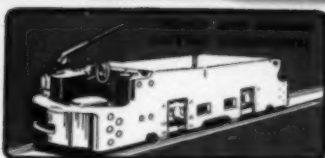
• A typical Jeffrey AERODYNE Fan installation in Southern West Virginia. For dependable ventilation throughout your underground workings, use a Jeffrey Fan



698-56

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JEFFREY

EQUIPMENT

FOR COAL MINES

THE JEFFREY MANUFACTURING COMPANY

Established 1877

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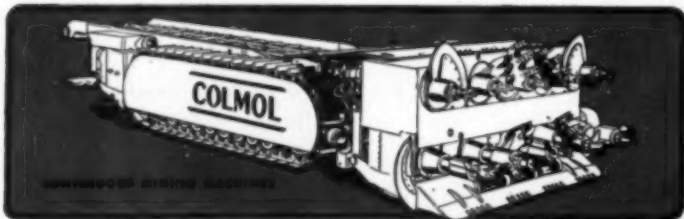
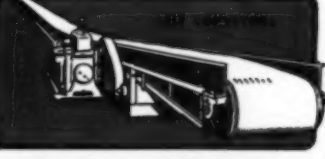
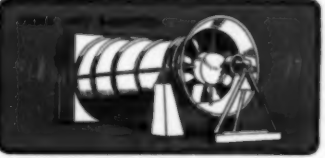
SERVICE STATIONS

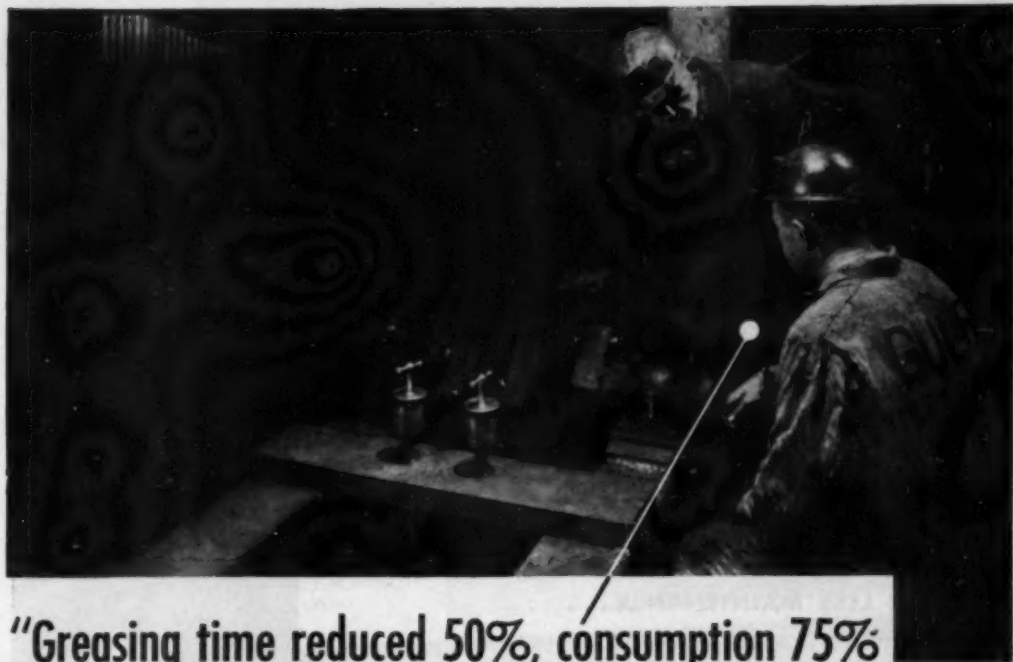
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"Greasing time reduced 50%, consumption 75%
since we switched to

GULF CAM GREASE"

— says this Tipple Foreman

"Gulf Cam Grease is tops for tipple lubrication," says this Foreman. "It not only provides better protection against wear but stays in the bearings much longer than any grease I've used before. In fact, we've reduced greasing time 50% on our tipple. And grease consumption is down 75%."

These are typical of the outstanding results obtained with Gulf Cam Grease in scores of breakers and preparation plants. Here's why it's so effective for shaker screen eccentric straps and other grease lubricated bearings:

Gulf Cam Grease has a high dropping point—it doesn't leak out even at high operating temperatures. Because it is stable at these high temperatures, it does not separate or oxidize appreciably. And unlike most high-temperature lubricants, Gulf Cam Grease is effective when wet conditions prevail.

With Gulf Cam Grease you'll make fewer bearing replacements, avoid lubrication troubles, and reduce maintenance costs. Why not give it a trial in your tipple bearings. For further information, call in a Gulf Lubrication Engineer. Write, wire, or phone your nearest Gulf office. Gulf Oil Corporation • Gulf Refining Company, Gulf Building, Pittsburgh 30, Pennsylvania.



THE S-D "FLOATER"...

America's No. 1 Mine Car Wheel!

"FLOATERS"

FOR FASTER . . . CHEAPER HAULING

Independent engineering firm tests prove that locomotives can pull up to 50% greater loads with no additional power requirement when cars are equipped with S-D "Floaters" instead of other types of precision bearing wheels . . . a big power and time saver!



"FLOATERS"

FOR LESS MAINTENANCE . . .

With "Floater's" solid closed front hub, and back double seal, grease stays in the wheel, dust and dirt stay out. Often "Floaters" require greasing no more than once in five years.



"FLOATERS"

FOR QUICK DEMOUNTABILITY

Any unskilled worker can remove and replace a "Floater" as easily as changing an automobile wheel. Bearings always remain in perfect adjustment on axle. When replaced there's no chance of pinching, misalignment, loose or tight bearings.



"FLOATERS"

FOR LONGER WHEEL LIFE

We believe our own special mixture of iron and exclusive heat treatment are responsible for making "Floaters" famous for their toughness and long wear . . . such quality is your assurance of perfect satisfaction.



Try S-D "Floaters". Check their savings. Experience proves that once an operator knows what "Floaters" will do for him, he specifies smooth-running "Floaters" for all wheel replacements. For complete information, write Sanford-Day Iron Works, Knoxville, Tenn.

SANFORD-DAY IRON WORKS

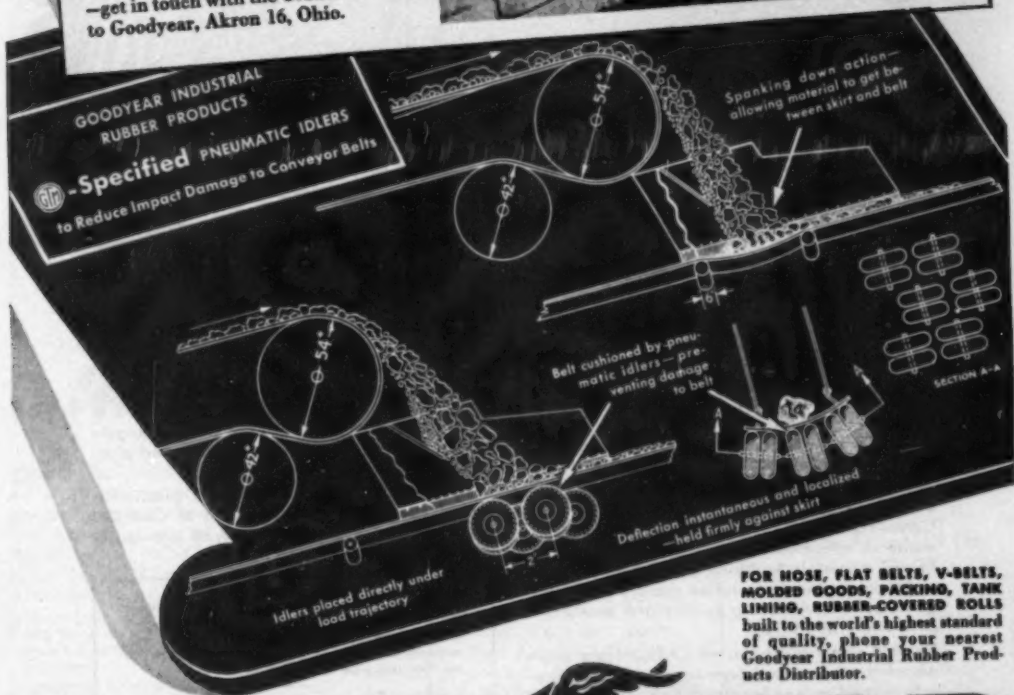
Double Tonnage

How the G.T.M. Increased Conveyor Belt Life 100%

PREVIOUS belt failed at less than 4,000,000 tons because of cuts and gouges caused by load impact.

The G.T.M.—Goodyear Technical Man—recommended installation of pneumatic idlers at impact point. **RESULT:** after carrying twice the tonnage, the belt has no cuts, no gouges and is still good for years' more service.

For help with your conveyor problems—old belts or new, long hauls or short—get in touch with the G.T.M. or write to Goodyear, Akron 16, Ohio.



FOR HOSE, FLAT BELTS, V-BELTS, MOLDED GOODS, PACKING, TANK LINING, RUBBER-COVERED ROLLS built to the world's highest standard of quality, phone your nearest Goodyear Industrial Rubber Products Distributor.

GOOD YEAR

THE GREATEST NAME IN RUBBER



Only Carlon ...

the first real pipe that is plastic!

Impervious to the chemical attack of sulphurous waters, alkalies, metallic salts and other corrosive wastes, **ONLY CARLON** meets the stringent requirements of mine piping installations. Guaranteed against rot, rust and electrolytic corrosion, it has a service life many times that of metallic pipe in both underground and surface mining operations.

Lightweight **CARLON** pipe installations can be made in minimum time without the need of heavy materials handling equipment or special tools. It can be installed rapidly for emergency service, or set up quickly and easily for permanent operation.

Flexible and rigid types of **CARLON** are produced in all standard pipe sizes. Flexible pipe is furnished in long lengths which require few-

er fittings per installation and conform to irregular surface contours as well as slope or entry direction. Rigid **CARLON** is supplied in threaded and coupled random 21-foot lengths which can be joined rapidly by threaded plastic fittings.

A complete line of standard I.P.T. plastic fittings is available to join lengths of **CARLON** or to connect this new pipe with previously installed metallic systems.

At present, raw material shortages are limiting the production of certain types of **CARLON** pipe. Every effort is being made to overcome this problem and to meet the need for **CARLON**... the first real pipe that is plastic.



310-CP

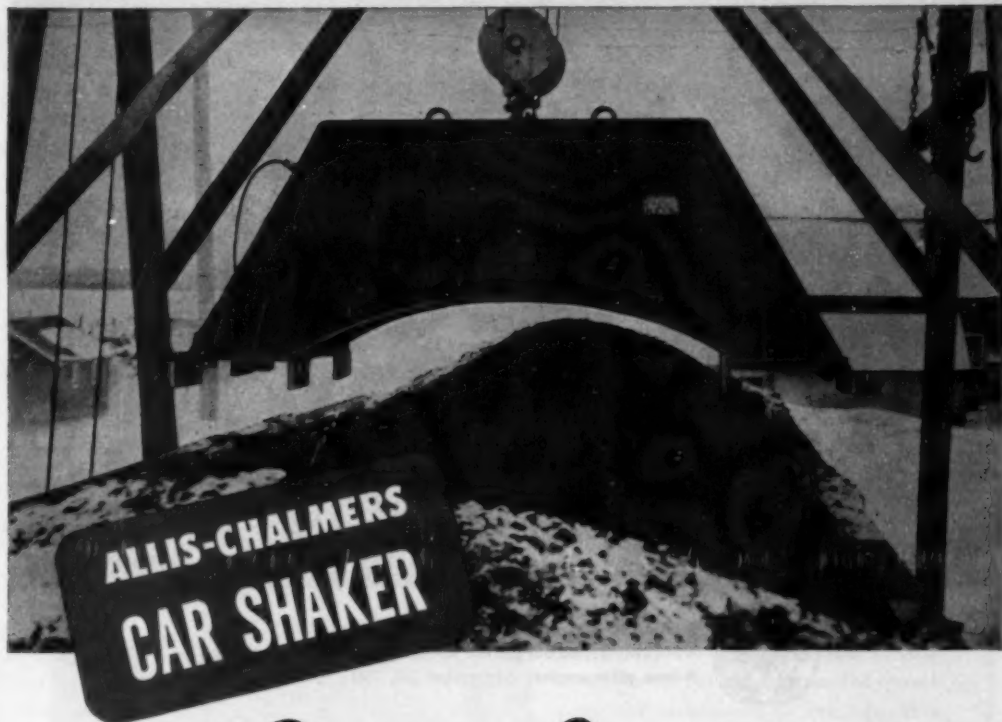
CARLON PRODUCTS CORPORATION

10462 Meech Avenue

Cleveland 5, Ohio

In Canada: Micro Plastics, Ltd., Acton, Ontario

FAST UNLOADING



...and Sturdy Construction

BESIDES BIG SAVINGS in man-hours and demurrage costs, operators report savings in maintenance and downtime with Allis-Chalmers car shakers. And no wonder! Allis-Chalmers has designed these units for long, dependable service without trouble. For example:

- ▶ Shaker body is one-piece, all-welded structure made of 1 in. thick reinforced steel plate and stress-relieved to eliminate welding strains.
- ▶ Motor and drive are totally enclosed within shaker body, protected from weather

and accidental injury. Motor is mounted in a special cradle base and protected from vibration damage with multiple shear mountings.

- ▶ Extra large bearing — 11 $\frac{1}{4}$ in. outside diameter. Long bearing life! Heavy duty shaft arranged for hydraulic bearing removal.

Get more facts about how Allis-Chalmers car shakers can save money in your operations. Call the A-C representative in your area. Allis-Chalmers, Milwaukee 1, Wisconsin.

Car Shakers Promote Safety to Personnel

ALLIS-CHALMERS

COAL AGE • August, 1951

Allis-Chalmers Mfg. Co.
Milwaukee 1, Wis.

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Get ready for the long haul—get your **Free TRUCK SAVER Inspection NOW!**



- Open to all International Truck owners
- No charge, no obligation for complete 99-point checkup
- Free offer expires September 30, 1951

If you want to make it easier to get peak efficiency from your International Trucks in an uncertain future, get your free Truck Saver Inspection now.

This Truck Saver Inspection is the first step toward warding off trouble in the uncertain months ahead. It can save you dollars now and could save you many more in the months ahead.

And the best part of it is that it doesn't cost you one penny. During the 90-day period ending Sept. 30, you can get your Truck Saver Inspection free of charge.

So if you want to protect yourself, make an appointment with your International Truck Dealer or Branch. Get your Truck Saver Inspection, get complete details on how the complete new International Truck Saver Plan can save you time, trouble and money.

Look what the complete International Truck Saver Plan offers

The complete International Truck Saver Plan has been developed by experts, after a thorough study of today's truck operating problems. It offers these benefits to International Truck operators:

1. **Better performance** over a longer truck life: trucks are kept in shape to do the most efficient job possible until they can be replaced by new units.
2. **Delays minimized** in getting new parts: by anticipating future requirements, the demand for needed parts can be accurately estimated.
3. **Maintenance costs cut**, down time reduced: by preventing major breakdowns, a big saving is effected in both time and money.

4. **Truck value maintained**; trucks kept in the best possible condition are worth more when it's time for replacement.

Start getting your Internationals in top shape for the future

Thousands of International Truck owners have already begun putting the International Truck Saver Plan to work for them.

Call your International Truck Dealer or Branch and arrange for a free Truck Saver Inspection. You'll get complete information on how the plan can keep your trucks rolling at peak efficiency.

International Harvester Builds:
McCormick Farm Equipment and Farmall
Tractors . . . Motor Trucks
Industrial Power . . . Refrigerators and Freezers



International Harvester Company • Chicago

INTERNATIONAL TRUCKS

Heavy-duty engineered for the long haul

WIRE ROPE



**You'll get smoother,
cost-saving service
with Roebling**

"BLUE CENTER" STEEL wire rope is an exclusive Roebling development. Its high resistance to abrasion, shock and fatigue spells long life. In addition, Roebling Preforming gives you a rope that is easy to handle...has better spooling qualities...reduces vibration and whipping. This combination makes Preformed "Blue Center" Steel Wire Rope a top performer on the job.

Roebling makes a complete line of wire rope...there's a construction for every installation. Have your Roebling Field Man help choose the *right* rope for your equipment. Get his advice on the correct use and maintenance of wire rope. It is based on performance records on thousands of installations. John A. Roebling's Sons Company, Trenton 2, New Jersey.

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For heavy duty conveyors...



Belt idlers manufactured by Continental Gin Company convey crushed stone from floor of quarry to screen house at this North Carolina Stone Company. Timken bearings in the idlers assure long idler life with minimum maintenance.



This dock unloading belt uses Timken bearing equipped idlers to handle 175 tons of crushed limestone per hour. Located in Newark, N. J., it's a Rex conveyor installation built by Chain Belt Company.



Linking a quarry to a processing plant three quarters of a mile away, this Barber-Greene conveyor system has a total of 8,556 Timken bearings in the idlers and moves 350 tons of crushed limestone per hour.

IT'S TIMKEN... AND TIMKEN... AND TIMKEN AGAIN!

AND HERE ARE 6 BIG REASONS WHY:

1. THOROUGHLY PROVED. The Timken® bearing is the only tapered roller bearing proved by 15 years or more of service in heavy duty conveyor installations using the popular dead shaft construction.

2. EXTRA CAPACITY. Line contact between rollers and races gives Timken bearings high load capacity. And by using Timken bearing sizes that are mass produced for the automotive industry you get extra capacity bearings that actually cost less than the smaller sizes you'd normally use.

3. LONG-LIFE LUBRICATION. Not just lubricated for "life" but lubricated yearly or as conditions require to insure long life. Fresh lubricant ends gummy, sticky, jammed bearings.

4. FRICTION MINIMIZED. Timken bearings' true rolling motion and extremely smooth surface finish practically eliminate friction.

5. LONGER ROLLER AND BELT LIFE. Less sliding and scuffing between idlers and belt.

6. MAINTENANCE REDUCED. Long life and dependable performance of Timken tapered roller bearings cut maintenance to a minimum.

Remember "Timken" is not a bearing type. It is a trade-mark applying only to bearings made by The Timken Roller Bearing Company. Always use Timken bearings in your conveyors. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

*Wherever the going's tough
industry turns to*

TIMKEN
TRADE MARK U.S. & REG. DES.
TAPERED ROLLER BEARINGS



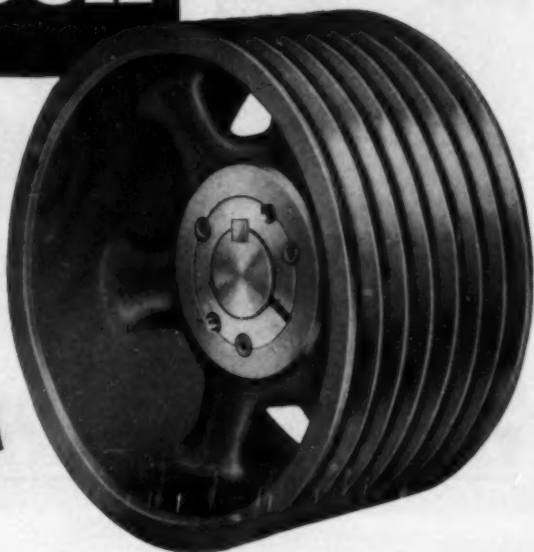
NOT JUST A BALL ○ NOT JUST A ROLLER □ THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST — LOADS OR ANY COMBINATION

There's only one **TAPER-LOCK**

Precision-Grooved

True Running

Easy on—Easy off



TAPER-LOCK bushing grips the shaft for the full length of the bushing — holds sheave with firmness of a shrunk-on fit. No wobble. Taper-Lock runs true!

No flange—no collar—no protruding parts. Flush machine-tool appearance.

Finest grade of close-grained semi-steel, cast in the Dodge foundry.

The grooves, machined on precision equipment, have identical pitch diameters.

This insures equal belt tension. Every belt pulls its share of the load!

TAPER-LOCK sheaves are available from distributors' stocks in complete range of sizes in A, B, C and D grooves.

DODGE SEALED-LIFE BELTS have special protection for tension members, insuring longer belt life. Perfectly matched to **TAPER-LOCK** sheaves.

DODGE MANUFACTURING CORPORATION, 3000 Union Street, Mishawaka, Ind.

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CALL THE TRANSMISSIONER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Equipment" in your classified phone book.

FIRST
IN POWER TRANSMISSION
MACHINERY!



V-BELTS AND TAPER-LOCK SHEAVES



DODGE-TINKER PILLOW BLOCKS

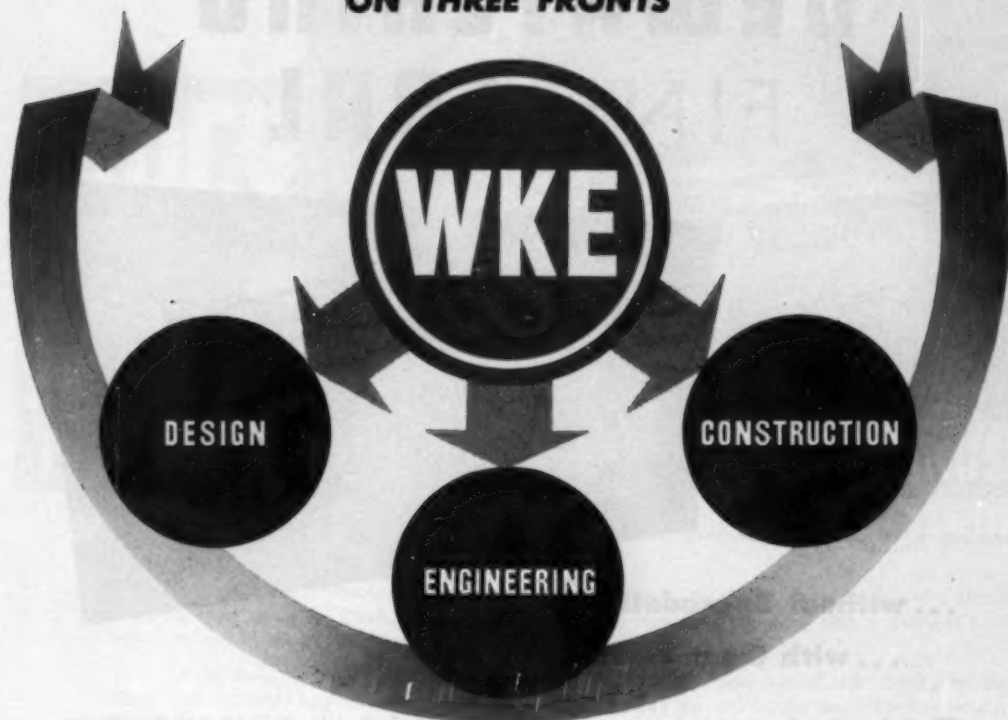


ROLLING GRIP AND DIAMOND D-CLOTURES



SOLID STEEL CONVEYOR PULLEYS

ORGANIZED FOR ACTION ON THREE FRONTS



The aggressive action which characterizes WKE is the result of sound organization and experienced personnel — plus a flexibility which assures top performance in one or all phases of the job.

In the fields of coal preparation, iron beneficiation, and metallic and non-metallic mining, the WKE insignia stands for competence in engineering and construction, plus an organization that gets the job done — better and faster.

Consult the nearest WKE office or representative for full details.

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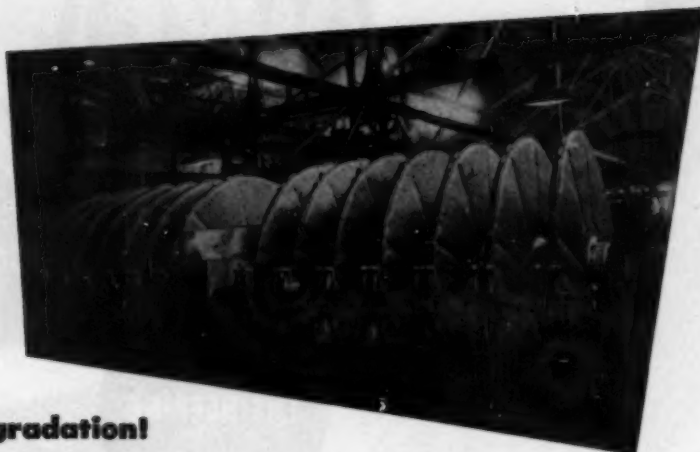
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WESTERN KNAPP ENGINEERING CO.

DIVISION OF WESTERN MACHINERY COMPANY

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DEWATERING FINE COAL



... without Degradation!

... with Clean Filtrate!

DO IT the American way. A play on words? Yes, but nowhere can you find a more effective, higher capacity unit for dewatering fine coal than the American Continuous Filter.

Better yet, nowhere can you find a unit which, considering the stream pollution problem confronting coal companies, will do what a real dewaterer is supposed to do: separate solids from liquids without letting the solids through in damaging percentages. Filtrate from the American Filter handling fine coal ($\frac{1}{8}$ " and under) carries on the average less than 1% solids.

And best of all — you will find that all this effective dewatering takes place *without any degradation of product*. The coal is handled gently.

Bring your fines dewatering problem to Oliver United. We have laboratory facilities and field test units for determining the best filter station. And we have several types of dewaterers to complement the American where sizes are such as to call for a different filter.

New York 18 — 33 W. 42nd St. Chicago 1 — 221 N. LaSalle St.
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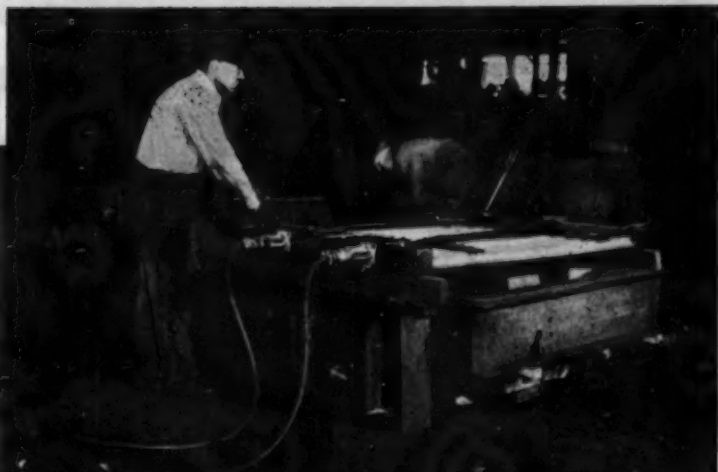
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Melbourne

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Johannesburg, Transvaal

TIREX HELPS

TAKE THE BUBBLES OUT OF STEEL CASTINGS



Foundries "skin dry" molds so that the molding sand will not give off a gas and cause bubbles or porosity in the casting.

Until a short time ago it was common practice in most foundries to skin dry molds with an open kerosene torch. It was slow, hot, dirty, disagreeable work and a moment's inattention could result in a burned and spoiled mold.

A Milwaukee foundry decided to get rid of this dirty, slow job of skin drying molds. They had infrared ray heaters developed. These heaters not only did away with the drudgery of the job but gave the foundry several unexpected dividends. First, the labor of the man drying the mold was eliminated. Second, spoiled molds became a thing of the past. But better still, because the infrared ray heaters were faster than the open kerosene torches, it was possible to dry an additional mold each day and that is a considerable dividend.

Of course the infrared ray heaters demanded a dependable pathway for power and that they got in TIREX Cables. This picture shows TIREX Cables connected to the heaters. TIREX not only operates dependably day in and day out but it safely combats the sharp abrasive foundry sand, it eliminates the danger from cable fires caused by flying molten metal sparks, and it takes in its stride the everyday abuse that is part of the job.

Isn't that the kind of service that you want from your portable cords or cables? Of course it is! This kind of service was deliberately built into TIREX Cords and Cables. They are a product of Simplex research.

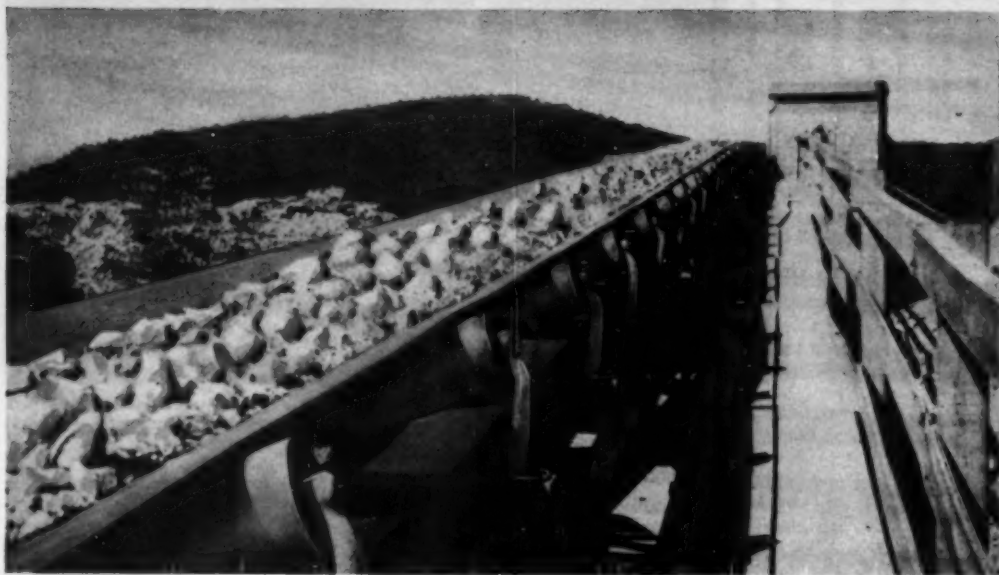
Simplex research gave you the first heavy duty, rubber-jacketed portable cord or cable; the first low water absorption insulation; the first rubber-jacketed underground cable. Besides these notable "Firsts" Simplex research has provided a great many developments which have enriched the art of cable design.

SIMPLEX-TIREX IS A PRODUCT OF SIMPLEX RESEARCH

SIMPLEX-TIREX

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.

BELTING BUILT FOR THE TOUGH JOBS



Hewitt-Robins Conveyor Belting gives longer service at less cost

When trouble comes by the ton... when you have heavy, abrasive, corrosive or hot materials to move, the easiest, most dependable and most economical way to do it is on a Hewitt-Robins Conveyor Belt.

For over half a century, the Hewitt Rubber Division of Hewitt-Robins Inc. has pioneered in making the right belt for every conveyor installation. Today, engineers the world over instinctively specify Maltese Cross® where the

going is really tough, Ajax® for general service, and Conservo® for lighter applications and portable conveyors.

In Hewitt Rubber belting they get full protection against moisture, oils, flexing and ply-separation, as well as treatment against mildew. They get abrasion-resistance from extra-tough rubber covers, heavily textile-reinforced for maximum strength plus flexibility.

Engineers turn to Hewitt-Robins not only for belting but for entire belt conveyor systems. They know Hewitt-Robins is the only firm able

to accept complete responsibility. For belting, address Hewitt Rubber Division, Buffalo 5, N. Y.; for machinery, Robins Conveyors Division, Passaic, N. J.; for engineering services, Robins Engineers Division, 157 Chambers Street, New York, N. Y.

HEWITT-ROBINS

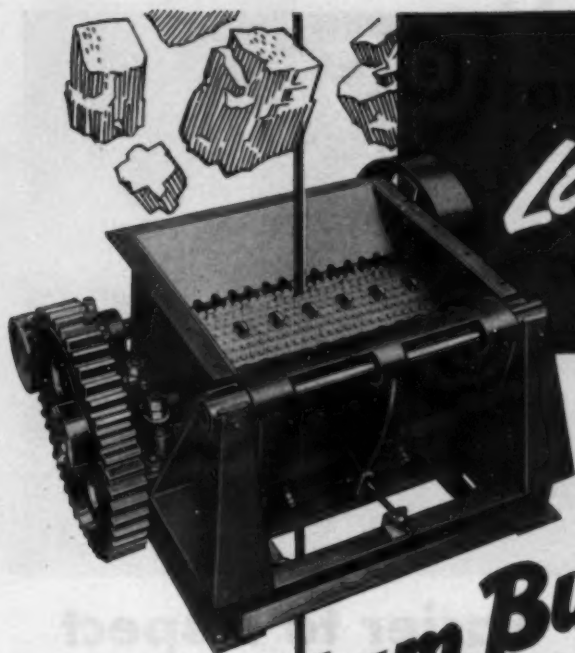
CONVEYOR BELTING

HEWITT-ROBINS



INCORPORATED

BELT CONVEYORS (belting and machinery) • BELT AND BUCKET ELEVATORS • CAR SHAKEROOTS • DEWATERIZERS • FEEDERS • FOAM RUBBER PRODUCTS • FOUNDRY SHAKEROOTS • INDUSTRIAL HOSE • MINE CONVEYORS • MOLDED RUBBER GOODS • RUBBERLOK® ROTARY WIRE BRUSHES • SCREEN CLOTH • SKIP HOISTS • STACKERS • TRANSMISSION BELTING • VIBRATING CONVEYORS, FEEDERS AND SCREENS



*Low Cost
Crushing-*

THE
McLANAHAN

Bantam Buster
Single Roll
COAL CRUSHER

—with cut Gears—Segment Rolls and Renewable Crushing Plate Tips

Crush hard or soft coal in strip or underground operations with the dependable, low cost McLanahan Bantam Buster *Single Roll* Coal Crusher. This machine crushes coal to desired size, with a minimum of operating and maintenance expense.

Bantam Busters have a high ratio of reduction and are portable, self-contained units, adaptable for any installation. They are furnished with 18" diameter roll up to 48" wide, and 24" or 30" diameter roll up to 60" wide. Crushing plate is quickly and easily adjusted to vary size of product. Roll and counter-shafts are carried on habbitted or self-aligning roller bearings. Investigate the possibilities of this machine for your operation.

WRITE
today for
Bulletin
BB-4712

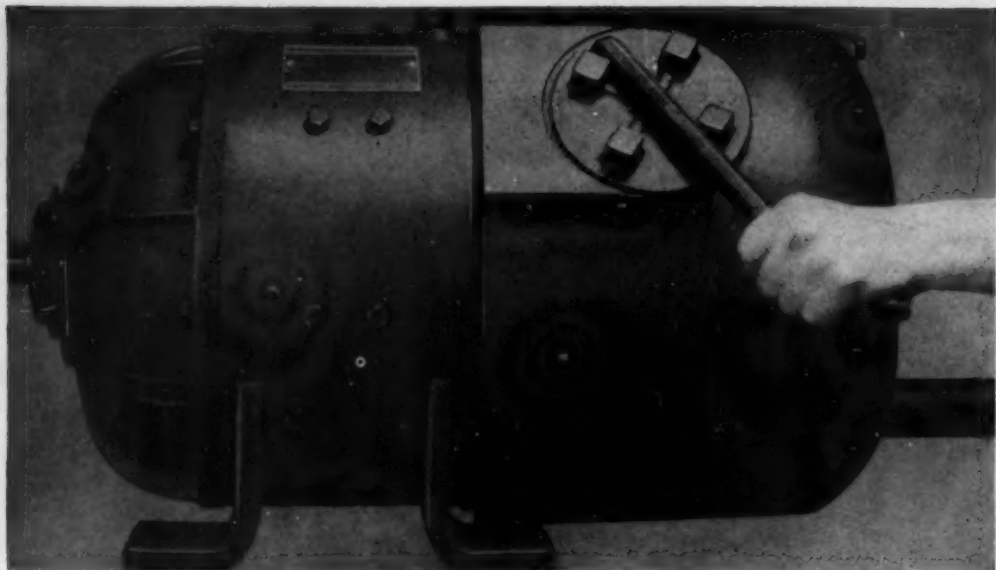


McLANAHAN & STONE CORPORATION

Pit, Mine and Quarry Equipment Headquarters Since 1835

Hollidaysburg, Pennsylvania

Dependable Products: Single and Double Roll—and Jaw Crushers, Crushing Plants, Recirculating Plate and Apron Feeders, Roll Grizzlies, Conveyors, Elevators, Screens, Scrubbers, Steel Log Washers, Sand Drags, Hoists, Aps, Dry Pans, Dryers, Scrap Handlers, Pulleys, Gears, Bearings, Sprockets, Sheaves, Rollers, Bin Gates, Elevator Buckets, Gratings, Car Wheels, Ferrous and Bronze Castings.



1 Unscrew hand-hole covers. These one-piece covers, easily screwed in or out without disturbing the fan housing, need no special tools for removal, have sturdy lugs not readily damaged by hammer blows.



2 Remove hand-hole covers. They're made of cast bronze to resist corrosion and seizing of threads. Unique in design, they let ventilating air wipe the entire surface of frame and end shield to assure adequate cooling. Cast-iron housing has grid to prevent contact with cooling fan by miners' fingers.



3 Inspect the brushes. There's wide-open accessibility to commutator and brush rigging. Screws connecting brush shunt lead to brush holder are easy to reach. Steel brush-holder yoke won't chip or crack if brush rigging is excessively tightened.

Easier to inspect —right on your mining machine!

New G-E mine motor brings all brushes within quick and easy reach, simplifies maintenance!

Now—with the new General Electric d-c mine motor—brush maintenance need no longer be a matter of taking the motor off the machine or working in hard-to-get-to areas. An innovation in mine motor design—two stud brush construction—permits locating all brushes on only one half of the commutator, directly under two large hand-holes, for easy accessibility.

And that's only one of 21 big features that add up to much easier maintenance, longer motor life, and easier installation. Full information on these new G-E motors—in ratings from $\frac{1}{2}$ to 50 hp—is contained in Bulletin GEA-5553. For your copy, ask your G-E representative, or write Dept. 663-16, General Electric Company, Schenectady 5, N. Y.

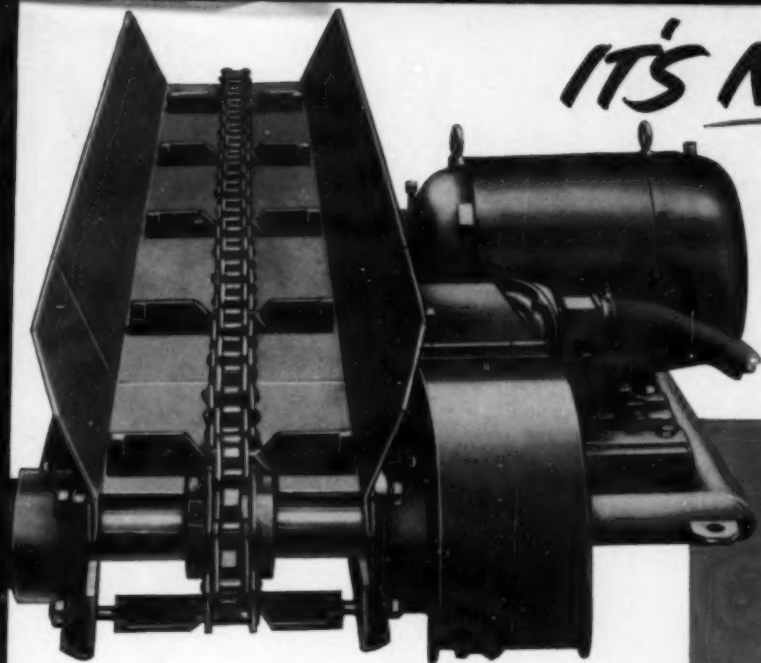
New

DC Mine Motors

Explosion-proof, listed by U. S. Bureau of Mines for any underground mining use

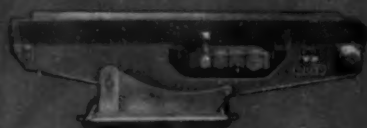
GENERAL  ELECTRIC

663-16



IT'S NEW!

***and a
LEADER***



Entirely new drive design makes the Model FA the most modern chain conveyor on the market. The reducer (see above) is built into the discharge section for maximum compactness.

JOY 1951 MODEL FA CHAIN CONVEYOR

**THE SIMPLEST, LIGHTEST, MOST COMPACT and
EFFICIENT DESIGN IN THE FIELD . . . 12", 15" and 20" SIZES**

Exclusive Features!

- ★ V-Belt drive, unaffected by misalignment, eliminates flexible coupling.
- ★ Helical and spur reducer—more efficient than worm reducers.
- ★ Ball-bearing mounted shear-pin sprocket—eliminates wear after shear.

LONGER SERVICE with LESS MAINTENANCE

Advantages You'll Like!

- ★ Compared to conventional drives, the new Model FA is 500 lbs. lighter and requires 4 sq. ft. less area.
- ★ Has non-jamming gravity take-up and drop-forged steel flights—flight integral with the link.
- ★ Available with open or closed-end tail sections. Three chains available: 19,000 to 27,000 lbs. ultimate strength.

*Consult a Joy
Engineer*

W & D CL 2247



JOY MANUFACTURING COMPANY

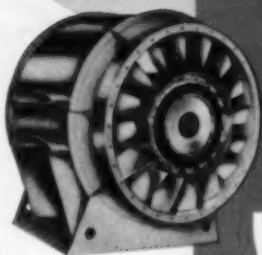
GENERAL OFFICES: HENRY W. OLIVER BUILDING • PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

AXIVANE® MINE FANS

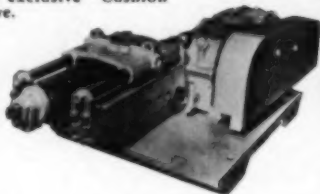
Vaneaxial-type fans for all main ventilation requirements—also Portable Blowers for auxiliary ventilation.

*Reg. U.S. Pat. Off.



SHAKER CONVEYORS

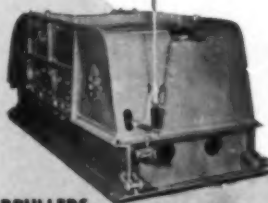
Below, the exclusive "Cushion Stroke" drive.



JOY

CONTINUOUS MINERS

Models for high and low coal.



CARPULLERS

Other utility equipment includes a Caterpuller, Pulldozer, Timber Setter, Material Trucks, etc.



MOBILE COAL CUTTERS

Above, the 12-RB Cutter, designed for very low coal. Other trackless units include the 10-RU and 11-RU Universal Cutters.

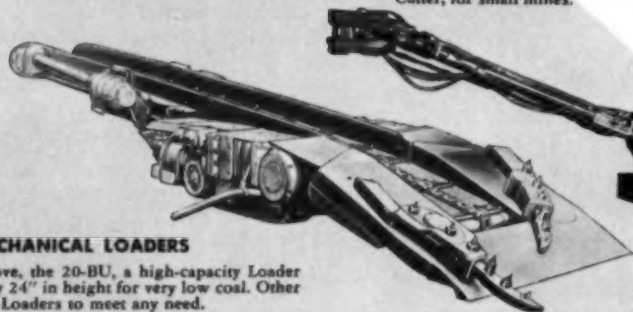


LOW VEIN SHUTTLE CARS

Above, the 8-SC Shuttle Car, only 26" high for use in very low coal. The Joy line includes Shuttle Cars in heights, types and drives to meet any coal-mining conditions.

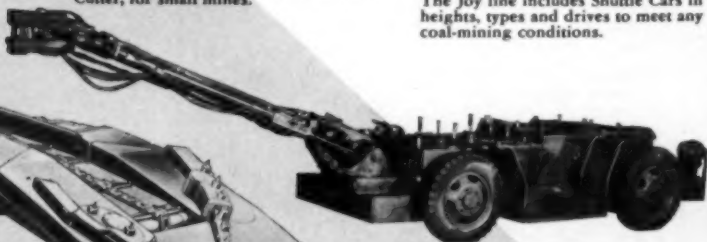
SHORTWALL COAL CUTTERS

Left, the 11-B Cutter, with Joy Bugduster for removal of cuttings from the kerf. Also the 7-B Heavy Duty, and 5-B1 Cutter, for small mines.



MECHANICAL LOADERS

Above, the 20-BU, a high-capacity Loader only 24" in height for very low coal. Other Joy Loaders to meet any need.



HYDRAULIC ROOF-BOLTING DRILL

Above, the RBD-1, fastest drilling machine built for roof bolting. Joy also builds a complete line of hydraulic Coal Drills, single and twin boom.

...Your Complete Source of Mechanized Mining Equipment

*FIELD-PROVED to Give You
Greatest Production Increases
and Cost Reductions*

JOY Mechanized Mining Equipment is the result of years of pioneering research, development and on-the-job engineering. It is the world's most complete line of modern mining machinery, built by the world's largest manufacturer in the field.

These facts have real importance for you because they give you positive assurance of equipment that can stand the gaff, stay on the job and operate with the sustained high efficiency that means greater tonnage and lower costs. Whatever your requirements or seam conditions may be, in soft coal or hard, there's a field-proved JOY unit to do the job best. • Let us work with you.

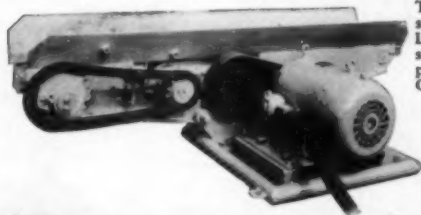
PERMISSIBLE MINE-AIR COMPRESSORS

B. of M. approved. Self-propelled (the WK-83, right) or draw-bar models, up to 240 CFM.



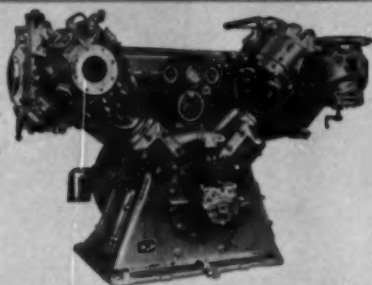
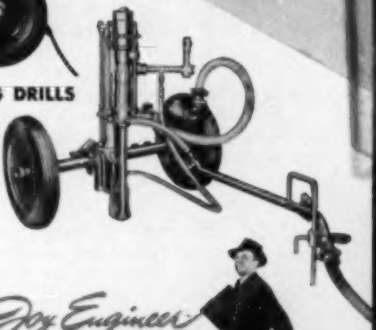
BELT and CHAIN CONVEYORS

Types and sizes to suit any conditions. Left, the new, light, simple and compact FA Chain Conveyor.



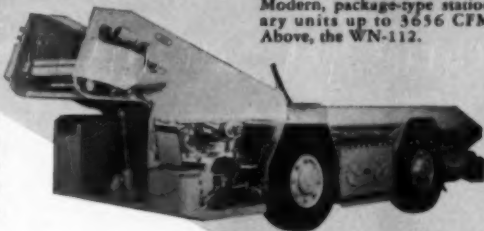
ROOF-BOLTING DRILLS

Right, the highly-mobile, fast-drilling SAW Wagon Stopper. Other drills for any roof-bolting need.



AIR COMPRESSORS

Modern, package-type stationary units up to 3656 CFM. Above, the WN-112.



HIGH-CAPACITY SHUTTLE CARS

Above, the 10-SC—a rugged, heavy-duty Shuttle Car that can handle coal and rock in full seam mining.

Consult a Joy Engineer

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING • PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO



Shear cuts can be made anywhere in the face with the JOY 10-RU Universal Cutter.

...It's EASY with the

JOY 10-RU CUTTER

HERE'S WHY JOY MACHINES LEAD IN MODERN FULL SEAM MINING

● JOY Machines bring you *double* advantage: they combine the merits of full seam mining with those of trackless mining, for greatest production per shift.

● The 10-RU makes both the shear cuts and horizontal cuts that full seam mining requires, to assure sufficient shattering of the parting for maximum loadability.

● The JOY 10-RU Universal Cutter is a fast-tramming, powerful machine which gives you the *faster* cutting required in trackless mining.

● JOY Loaders and Shuttle Cars stay right behind the Cutter—assuring the greatest possible tonnage loaded out, at the least cost per ton.

Write for
Bulletins, or

*Consult a
Joy
Engineer*



W80 CL 2347

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING • PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

Here's why ANACONDA Shuttle Car Cable is the best you can buy

Problem: Moisture can be tough on mine cables.

Solution: ANACONDA Mine Cables are made with COLD RUBBER Type RH Insulation—are not only much more resistant to moisture, but also to overheating.

Problem: Short-radius action over sheaves induces conductor fatigue, hastens cable failure.

Solution: More effectual stranding of Anaconda conductors means more resistance to fatigue.

Problem: Mine service subjects cable to frequent and severe crushing and cutting action. Leads to shorts.

Solution: ANACONDA Mine Cables have an improved (30% tougher) neoprene jacket—withstand much more crushing and cutting action. Besides, there's the patented anti-short breaker strip for extra protection.

Problem: Mine service often subjects cable to severe tensile strains which can lead to cable destruction.

Solution: ANACONDA Mine Cables have a new s-t-r-e-t-c-h-a-b-l-e ground wire which greatly increases cable life under excess tension. Furthermore, special neoprene-treated glass cord reinforces the protective insulation and jacket.

Problem: Tough new cable problems are being presented by the severe cable requirements of the new, continuous mining machines.

Solution: Anaconda has the answer in a new, specially designed cable for continuous mining machine and shuttle car service.

and that isn't all!

For complete information, get in touch with your nearest Anaconda Sales Office or Anaconda Distributor. Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

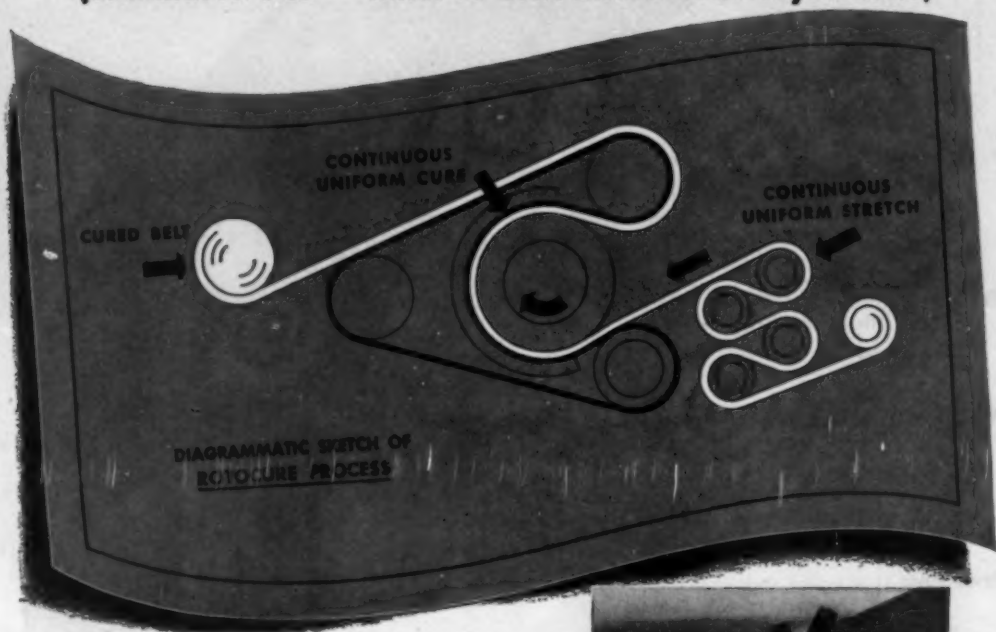


the right cable for the job ANACONDA®

WIRE AND CABLE

The Principle of ROTOCURE is Simple—the Results Dramatic

(Eliminates OCS*—killer of Conventional Conveyor Belts)



Place a hot flatiron too often on the same spot of a pair of pants and you weaken the fabric. Use conventional flat press methods of curing belting and you *weaken the structure similarly*. Flat press curing cannot help but result in these overcured segments because these sections (2" to 4" long across the belt width) get a double "treatment" as previously cured areas advance *less than a full press length*.

Not so with ROTOCURE. In this *continuous* method of vulcanization double curing due to press overlapping is eliminated because the belt is in constant uniform motion. Product-wise you get these vital advantages:

1. Increased belt flex life — as much as 40%
- ... 2. Elimination of mechanical distortion at the press ends ... 3. Constant, uniform stretch



"Overcured Sections — present every 30' to 40' in all belts made by the flat press method. Only Rotocuring (continuous, non-stop curing) eliminates this major cause of belt failure."

... 4. Uniform, abrasion-resistant covers. These product advantages are paying off for BWH Conveyor belt users in more work hours per belt, savings per ton in materials conveyed and rock bottom maintenance costs. Are you one of them? If not, ask your BWH distributor or write us direct.**

**At the same time, get the story on BWH rotocured transmission belts which permit operation at lower tensions.



Another Quality Product of
BOSTON WOVEN HOSE & RUBBER COMPANY

Distributors in all Principal Cities

PLANT: CAMBRIDGE, MASS. • P. O. BOX 1071, BOSTON 3, MASS. U. S. A.

Here's how you can tell the chain with SHOT-PEENED rollers...



LOOK FOR THE
DISTINGUISHING
DARKENED ROLLERS

Thousands of tiny steel balls hammer the metal—"cold work" each roller... pay off in extra fatigue life... added ability to withstand shock and impact.

...the chain that has extra fatigue life

YES, you want to be sure you get shot-peened rollers on the next roller chain you buy. Shot-peening gives rollers the extra fatigue life needed to take repeated shock and impact loads.

These chains are high in tensile strength, durable under severe loads, relatively light in weight and uniform in pitch. This accounts for their wide acceptance throughout industry for both drive and conveying purposes.

Thanks to constant research and precise manufacturing controls, every Link-Belt Precision Steel Roller Chain meets the highest standards for uniform strength. You get a positive, long-life drive—unaffected by heat, cold or moisture.

Link-Belt Roller Chain is available in single or multiple widths, in $\frac{3}{8}$ to 3 in. single and double pitch. For all the facts, call your nearest Link-Belt office.

LINK-BELT

PRECISION STEEL ROLLER CHAIN



Easier coupling and uncoupling without sacrificing load distribution

Patented E-Z Assembly feature of Link-Belt Precision Steel Roller Chain has won world-wide approval. Coupling and uncoupling of multiple width chains—right on the job—is far easier. There's absolutely no sacrifice of load distribution... no loss of the chain's remarkable performance. Press-fits between chain pins and middle bars have been modified. But full load carrying capacity across the entire width of the chain has been maintained.

LINK-BELT COMPANY: Indianapolis 6, Chicago 9, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 93, Seattle 4, Toronto 8, Springs (South Africa). Offices, Factory Branch Stores and Distributors in principal cities.

The Modern Way to Minimize Roof Falls



In the past, many mine operators, accepting roof falls as a necessary evil, relied on haphazard timbering and other antiquated methods to support mine roofs. As a result, roof falls occurred with alarming frequency, causing injuries, loss in production, and reduced revenue.

Today, some of these operators are supporting their roofs by using either the Bethlehem Slotted Roof Bolt with Wedge (at right), or the Bethlehem Square Head Roof Bolt with Expansion Sleeve (at left).

Either combination minimizes the possibility of roof falls, and permits greater economies and more efficient mining by reducing the need for conventional roof support. Bethlehem Roof Bolts are made of new-billet steel, and come in lengths to meet individual requirements. They can be installed either vertically, or at 45-deg or 60-deg angles. They may be used in combination with roof ties, roof channels, roof plates, plate washers and angle washers. For complete information, get in touch with us at Bethlehem, Pa.

BETHLEHEM SLOTTED ROOF BOLT

One end of bolt is slotted for 6 in. to accommodate a wedge. Opposite end has 5 in. of 1-in. rolled thread. Bolt is usually furnished with regular square nut. When back of hole is reached, wedge is forced deep into slot, expanding end of bolt to provide tight fit.

BETHLEHEM SQUARE HEAD ROOF BOLT WITH EXPANSION SLEEVE

This assembly consists of a special $\frac{3}{4}$ -in. rolled-thread bolt and expansion sleeve. Special unchamfered square head provides greater wrenching surface. Has forged washer under head for additional bearing surface. When assembled and tightened, bolt is engaged by a forged-steel tapered plug, the flat surfaces of plug spreading the rough-surfaced prongs of expansion shell to provide tight fit. Two pressed ears on shank support expansion sleeve while anchoring.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

*On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation, Export
Distributor: Bethlehem Steel Export Corporation*



BETHLEHEM MINE ROOF BOLTS

PARIS MANUFACTURING COMPANY

Announces

THREE NEW DRILLS

The PARMANCO Coal Drill will drill 3½ inch holes at a speed of up to six feet per minute in #5 coal. Equipped with heavy duty truck-type transmission and rear end and a complete hydraulic feed, the drill is operated by one man from the control seat. It is made in two sizes with a 13 h.p. or 25 h.p. gas motor and all units are completely self-contained and enclosed in oil-tight cases.

ALREADY USED by

Big Bend Collieries, Inc.	Essex Coal Co.
Calhoun Electric Coal Co.	Southwestern H. Coal Co.
Fairview Collieries Corp.	Trans-Texas Coal Company
Colonial Coal Co.	Schroeder Field
Little Star Coal Co.	Warlick-Walker Subterranean Co.
Horse-Shoair Coal Mining Co.	Union Subterranean Co.
Shirwood-Templeton Coal Co.	A. P. Green Fire Brick Co.

**THIS UNIT IS DELIVERING 6-INCH SHOT
HOLES — READY FOR LOADING
at Better Than Two Feet a Minute ! ! !**

The new PARMANCO Hi-Speed Horizontal Drill is completely redesigned around a 40 h.p. engine with four drilling speeds which, in field tests, has cut one-third off the footage drilling time — a cost-per-drilling-foot saving that we are passing on to the strip mine operator and contractor at no increase in our price. In addition the drill is equipped with a starter and generator, dual type front wheels, truck type rear axle with mechanical brakes and a traction drive with both forward and reverse.

**PARIS
MANUFACTURING
COMPANY**
Piquette, Ohio



in **WIRE ROPE**, too

It's all in the RIGHT KIND of Muscle

The powerful, rugged muscles of a charging rhino enable him to propel his tremendous bulk and weight at truly remarkable speed. Nature designed them well for the purpose they have to serve.

In wire rope, too, the right kind of muscle is vitally important... because different types of jobs present different types of destructive forces. Bending fatigue! Shock stress! Abrasion! Load strain! Each demands wire rope that best combines the required resistance characteristics.

Wickwire Rope gives you the benefit of long experience and specialized know-how which assures you of exactly the right kind of rope your particular job demands.

For additional information write or phone our nearest sales office.



**LOOK FOR
THE YELLOW TRIANGLE
ON THE REEL**

EAST: WICKWIRE SPENCER STEEL DIV.,—Boston • Buffalo • Chattanooga • Chicago • Detroit • Emeryton (Pa.) • Philadelphia • New York
WEST: THE COLORADO FUEL & IRON CORP.,—Abilene (Tex.) • Denver • Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
PACIFIC COAST: THE CALIFORNIA WIRE CLOTH CORP.,—Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane

WICKWIRE ROPE



PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL & IRON CORPORATION

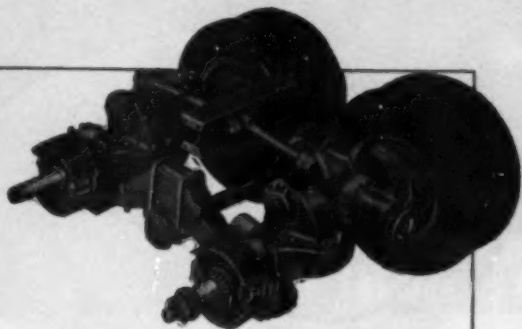
MACKS make light of heavy loads . . .

Big Mack super-duty trucks make the hard jobs look easy...because in design and construction they incorporate numerous outstanding features that contribute to easy maneuverability, ease of control and positive traction regardless of terrain.

Powerful Diesel Engines! Hydraulic Power Steering! Air Assist Clutch! Flexible Rubber Shock Insulators! Mack's famed Balanced Bogie and Power

Divider. All are Mack features that assure power and strength for the heaviest loads; flotation and traction for the most slippery mud or sand.

Your nearest Mack branch or distributor will give you the full story on what Macks can do for you in trouble-free, uninterrupted schedules... greater profits through greater output at lower cost. You'll find it's a story well worth hearing.



Only Mack gives you all the advantages of the famed Balanced Bogie. Positive traction because of exclusive Power Divider. No spring twist because of Mack Rubber Shock Insulators. Inherent flexibility eliminates chassis distortion. Extended tire life because of uniform tire loading. Minimum maintenance because of simplicity of design.



...outlast them all

Mack Trucks, Empire State Bldg., New York 1, New York. Factories at Allentown, Pa.; Plainfield, N. J.; Long Island City, N. Y. Factory branches and distributors in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.





The Joy Sulmet Type SM Bit, an exclusive design of proved superior efficiency.



JOY SULMET BITS

PROVE AGAIN THEY'LL CUT YOUR COSTS

CONDITIONS

Comparative performance of Joy Sulmet Type SM Bits and two other makes of tungsten carbide bits on a Joy Continuous Miner. Seam about 96" thick—hard firm coal with a 1" or 2" rock parting, normally about 2 ft. from the top. Occasional sulfur intrusions in the coal; in general, fairly hard cutting.

RESULTS

	Joy SM Bits	Bits B	Bits C
Tons mined in test.....	8113	7873	9145
Comparative Bit Cost per ton, including grinding and setting.....	Low	8.8% higher	77.0% higher

The figures above demonstrate once more that Joy Sulmet Bits are best for the Continuous Miner, as well as for cutting machines of all types—a superiority well established in many different mining areas and under widely varying conditions. The exclusive Joy design, with a protective cap over the tungsten carbide insert, results in fewer broken bits and eliminates lost inserts.

Write for Bulletin, or

Consult a Joy Engineer



W99 CL 9815

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING • PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

SAVE MANPOWER

Equipped with hydraulic grapple, this H-2 Hydrocrane swings mine timbers into a car. Control is so precise loads can be moved a fraction of an inch if necessary. Attachments for greatly speeding dozens of mine jobs include hydraulic clamshell, bulk materials bucket, coal car cleaning bucket, grapple, magnet and crane hook. Two crane sizes, 2-ton $\frac{1}{4}$ -yd., 3-ton $\frac{1}{2}$ -yd.



Muck comes up, shaft goes down—fast with Hydromucker.

Eliminate tough, expensive hand mucking with the Hydromucker. Hydraulic bucket controlled from upper shaft loads blasted rubble from shaft floor to skip on other conveyor for removal to surface. Owners report 35 percent faster mucking, 30 percent less manpower by using the new Hydromucker.

The Safe Hydrocrane Way

WITH the fully hydraulic Bucyrus-Erie Hydrocrane, heavy mine timbers, steel beams, bulk material can all be handled in a fraction of the time required with hand labor—with greatest safety to men. This crane is built for extra-safe operation—starting right at the simple hand lever controls. No tricky hand-foot coordination required—no clutches or brakes to slip and grab.

Exclusive "deadman" control feature means automatic protection for miners working around crane loads. If operator lets go, all levers return to neutral—load stops dead.

Hydrocrane safety features protect the crane too. Outriggers extend and retract hydraulically in seconds—provide a firm, steady base. They protect truck frame and springs from twisting, wracking strains... safeguard tires from bursting pressures during heavy lifting.

And you can't overload the hydraulic system trying to lift excessive loads. Before oil pressure builds up to a point beyond safe limits a by-pass relief valve opens. Fast-working Hydrocranes have many features that reduce man-hours, protect the men—and safeguard the machines as well. Write today.

BUCYRUS-ERIE HYDROCRANE DIVISION South Milwaukee, Wisconsin

Gentlemen:.....Please send Hydrocrane literature.

.....Please send Hydromucker literature.

Name.....

Company.....

Address.....

City..... State.....

124M51

BUCYRUS-ERIE
HYDROCRANE

South Milwaukee, Wisconsin

"One man's meat is another man's poison..."



"I'm blasting a ditch. I want to throw that much UP and OUT. The farther it flies the better. This is a good blast for me, because it's doing what I want—it's making ditch."



"I'm blasting for rock. I don't want to throw it up in the air. I want it broken and dropped for my shovels. Here much of the power of the explosives is going to waste. A mighty poor blast for me!"

The blast that is just right for one operator may be all wrong for another. A ditching shot like the one at left above is meat for the farmer or agricultural engineer. But such throw is strictly poison for blasting work in quarries, strippings and most construction jobs.

The ROCKMASTER Blasting System gives better control over explosives force—enabling you to strike the proper balance between throw and breakage—to suit *your* job.

Your Atlas representative will be glad to help you use the proper combination of the 16 available ROCKMASTER split-second delay detonators, plus explosives and loading methods especially suited to your requirements.

Write today for the ROCKMASTER "16" booklet, showing typical loading diagrams for several types of quarrying, stripping and construction blasting operations. It's yours for the asking.



ROCKMASTER "16" TIMINGS

Rockmaster No.	Avg. Time of Each Delay from Zero (milli-seconds)
0 (zero)	0 (inst.)
1	8
2	25
3	50
4	75
5	100
6	125
7	150
8	175
9	200
10	250
11	300
12	350
13	400
14	450
15	500
16	550

ROCKMASTER: Reg. U.S. Pat. Off.

ATLAS EXPLOSIVES

"Everything for Blasting"



ATLAS POWDER COMPANY, Wilmington 99, Del. • Offices in principal cities • Cable Address—Atpowco

See them in action!

Goodman TRACTOR TREAD LOADERS

Mine performance is the strongest evidence Goodman can offer of the ability of its tractor tread loaders to produce high tonnages. Here are some of the reasons why these loaders rate so highly:

Type 660 Loader

...Swinging loading head — permits 17 foot clean-up width with only forward and backward movement of the machine. Posting can be close to the face.

...Swinging discharge end—can be swung 40° to either side and raised or lowered to shuttle car height.

...Loading efficiency—powerful digging ability in tight coal, excellent clean-up, action of gathering arms and chains is smooth and continuous.

...Safety for operator—unobstructed vision of all movements of both loading and discharge ends, all movements secured through conveniently grouped finger tip hydraulic controls.

...Sound design—construction is rugged throughout with convenient accessibility to working parts for inspection or repair.

Before you decide on any...see Goodman loaders in action. A Goodman sales engineer will be glad to arrange a mine visit.

GOODMAN TRACTOR TREAD LOADERS

Type 665 — 43" over-all in height with adequate ground clearance for soft bottom. Suited for discharge into large shuttle cars.

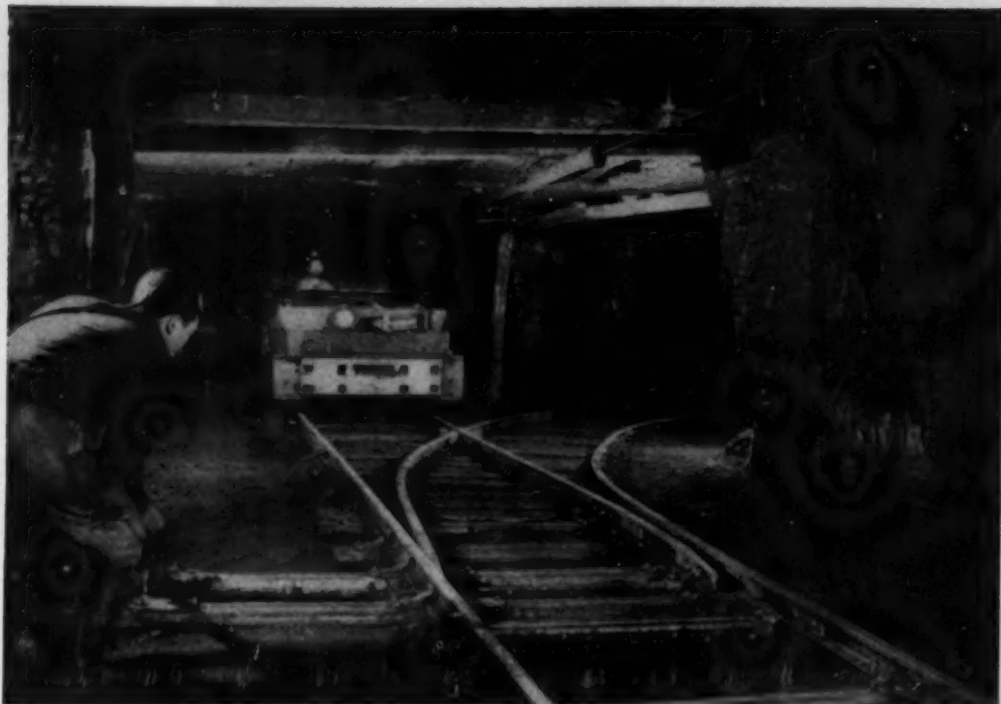
Type 660 — 22" coal line height with an over-all height of 31½".

Type 860 — for very low coal. Its over-all height is 26½"; its coal line height only 17".

Goodman MANUFACTURING COMPANY

HALSTED STREET at 48th • CHICAGO 9, ILLINOIS

CUTTING MACHINES • CONVEYORS • LOADERS • SHUTTLE CARS • LOCOMOTIVES



One of the soundest purchases any mine can make ... BETHLEHEM PREFABRICATED TRACK

Bethlehem furnishes everything in prefabricated mine track—rails, turnouts, steel ties, switch stands, braces, and all other components. This makes it possible for the mine owner to install a completely integrated layout, one in which every part works in harmony with all the rest.

When Bethlehem supplies the whole system, there are no makeshift items, no odds and ends to cause trouble. There's no struggling with substitute or "home-made" parts, which often mean a dangerously loose track structure. All elements of Bethlehem track are designed to fit easily into their proper places; joints are snug, braces and frogs and guard rails tight. Your layout therefore requires less maintenance; you have properly-aligned track right up to the working face, and you can safely run your trips at higher speeds.

Economy? Well, as a sample, consider one tremendous factor—installation costs. Many mines that for years cut and bent their own rails have now found the

practice much too expensive, and needless as well. Today they're making big savings with Bethlehem prefabricated track, which comes to the purchaser with all rails cut to proper lengths and curved to the proper radii. This feature alone has meant outstanding reductions in track-laying time.

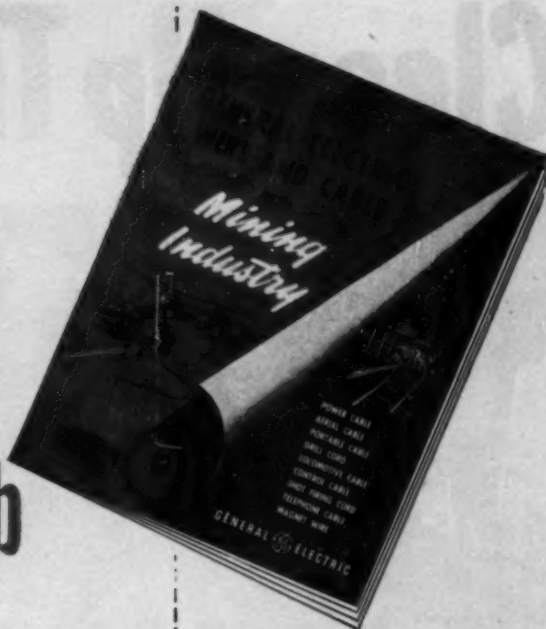
When planning replacement layouts or new haulage-ways, ask a Bethlehem engineer to study your workings. He'll be glad to make an analysis and submit plans for a complete track system built to your requirements.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation





CABLES for every mining job



Whatever your requirements for rugged mining applications, you will find tough General Electric cables give you long, reliable service.

Whatever your operation—coal or metal, underground or open cut—you can have the advantage of General Electric's years of experience . . . experience that offers you cables designed for specific applications . . . cables known for their resistance to impact and abrasion . . . cables that are light and flexible, easy to handle—that help to speed up your operations.

For quick reference on G-E mining cables, write for your copy of a handy new booklet, "General Electric Wire and Cable for the Mining Industry". And remember, General Electric cable engineers, specialists, and distributors are always ready to assist you in planning for special-purpose as well as standard cables.

for ready information on

- Power Distribution Cable
- Trailing and Reel Cable
- Lighting Cable
- Aerial Cable
- Direct-burial Cable
- Mine Telephone Cable
- Control Cable
- Magnet Wire
- Shot-firing Cord

get this 24-page fact-filled booklet,
with descriptions, and selection data
for all types.

MAIL COUPON NOW!



Section W63-814
Construction Materials Division
General Electric Company
Bridgeport 2, Connecticut

Please send me a free copy of "General Electric Wire and Cable for the Mining Industry."

Name _____ Title _____
Company _____
Address _____
City _____ Zone _____ State _____

You can put your confidence in—
GENERAL  ELECTRIC

Clean Up The R.O.M.



... and **WATCH COAL PROFITS ZOOM!**

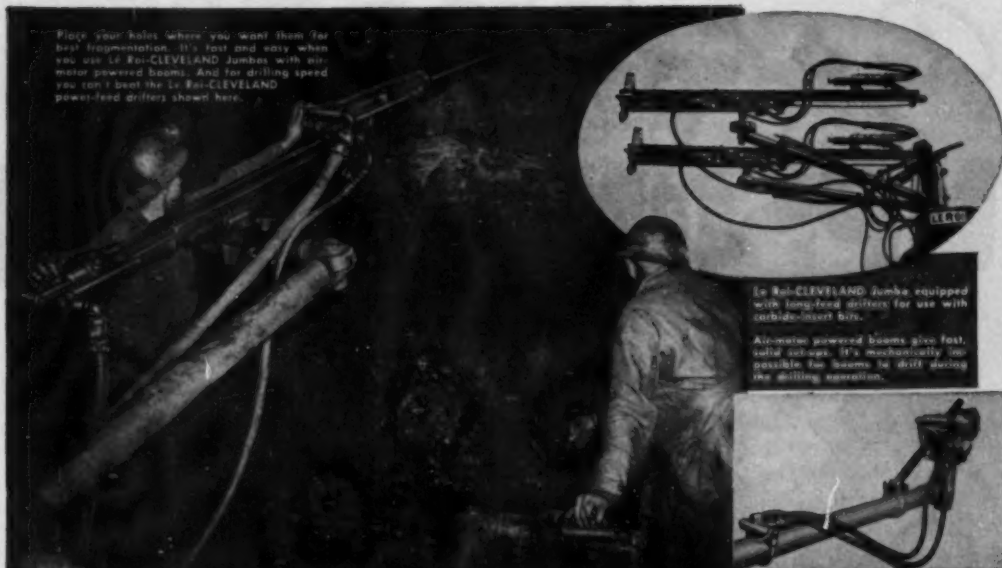
Clean coal—properly sized coal . . . it's a *must* for profitable sales today. Yes, and the Seco way of screening, sizing and cleaning is winning the acclaim of profit-wise producers everywhere. Hour after hour, day after day, year after year these ruggedly built Seco vibrating screens are preparing coal for top market prices at a cost of a few pennies per ton. It's a fact! You see, the patented equalizer assembly sets Seco apart from any other piece of equipment of this type. Only Seco has fully controlled true circular action . . . for maximum tonnages and accurate screening . . . with no bobbing . . . no weaving . . . no bogging down under the load. Over 300 models with single, double, triple and three and one-half decks . . . and with screen openings to produce any and all desired sizes.

Check Your Coal Preparation Costs Now! A SECO field man will bring you helpful modernization information, or write for Coal Bulletin #11, Dept. C.



SCREEN EQUIPMENT COMPANY, Inc.
1750 Walden Avenue, Buffalo 21, New York
In Canada: United Steel Corp.
Toronto, Ontario

Place your holes where you want them for best fragmentation. It's fast and easy when you use Le Roi-CLEVELAND jumbos with air-motor powered booms. And for drilling speed you can't beat the Le Roi-CLEVELAND power-feed drifters shown here.



Le Roi-CLEVELAND jumbos equipped with long-feed drifters for use with carbide-insert bits.

Air-motor powered booms give fast, solid set-ups. It's mechanically impossible for booms to drift during the drilling operation.

Drilling-Cycle Time Reduced, Footage per Shift Increased

**... when you use Le Roi-CLEVELAND Jumbos
and power-feed drifters in your rock headings**

THERE are three things you have to do if you want to save time in your drilling cycle and increase your footage — reduce set-up time, drill out the round faster, and shorten tear-down time.

You know this and so do we. That's why we designed the Le Roi-CLEVELAND jumbo the way it is. And that's also why our drifters drill so fast.

Let's see what you get when you use Le Roi-CLEVELAND:

- ★ The most flexible jumbo available. Air-motor powered booms let you space your holes quickly and easily for most efficient fragmentation.
- ★ Rigid, non-slip set-up feature keeps drifters in line, prevents steel binding, saves wear and tear

on chucks, results in higher average drilling speeds.

- ★ Strong rotation, plus snappy yet powerful force of blow of Le Roi-CLEVELAND drifters gives you unexcelled drilling speed. This drilling speed coupled with the fast, positive feeding action of our power feed gives you the right pressure for fastest drilling and reduces drill-steel changing time.

You add all these advantages together when you use Le Roi-CLEVELAND jumbos and power-feed drifters. The outcome is faster drilling cycles, more footage per shift—so why not standardize on these cost-cutting honeys. Write for complete information.



LE ROI COMPANY

CLEVELAND ROCK DRILL DIVISION

12500 Berra Road, Cleveland 11, Ohio

RD-42

Rope leads from **UPSON-WALTON**



Selecting the "lay" of wire rope

• An important characteristic of a wire rope is its *lay*—the relative directions in which wires in the strands, and strands in the rope are twisted.

In *regular lay* rope, the wires in the strands are twisted in the opposite direction to the strands in the rope.

However *lang lay* rope—in which wires and strands are twisted in the same direction—offers several advantages:

- It flexes better
- It has more resistance to abrasion
- It has more resistance to bending fatigue

When choosing *lang lay*, be sure to specify that it be "preformed". An extra operation in the manufacture of Upson-Walton's LAYRITE preformed rope forms the wires and strands in a fixed spiral. This frees each part from internal stress. Years of rugged service have shown that Upson-Walton's LAYRITE wears longer, cuts maintenance costs.

Specify it on your next tough job.

THE UPSON-WALTON CO.

CLEVELAND, OHIO

NEW YORK • CHICAGO • PITTSBURGH

**wire rope • rope fittings
brattice cloth • tackle blocks**

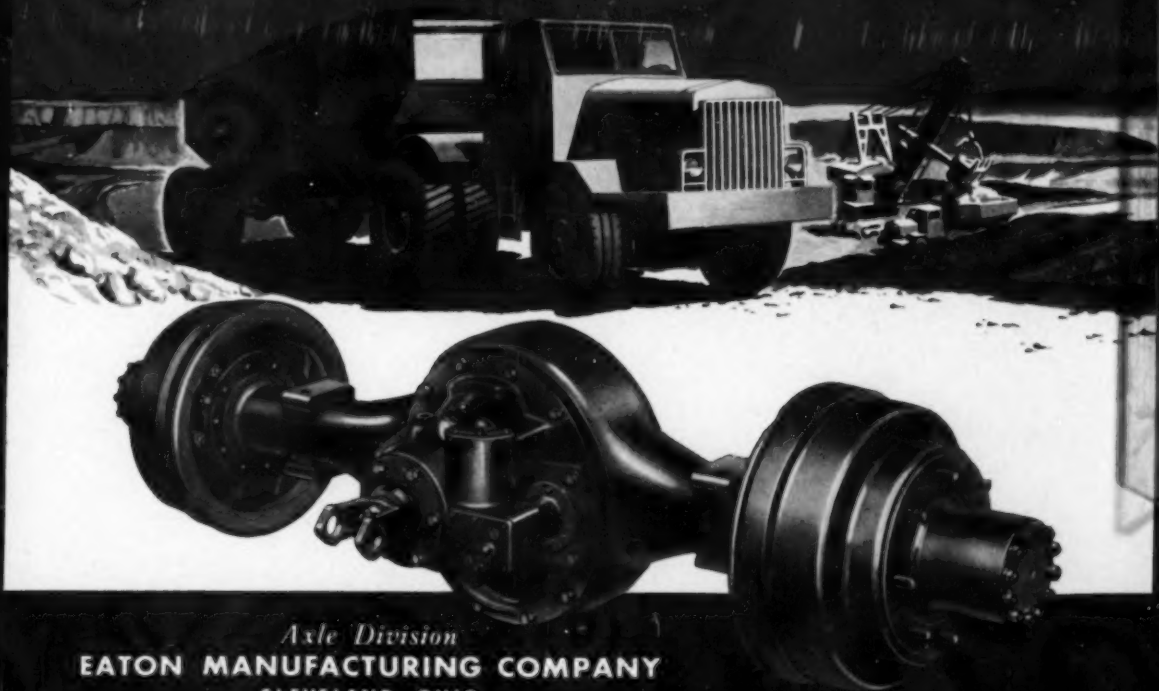
MATCH YOUR WIRE ROPE TO YOUR FITTINGS AND BLOCKS... ONLY UPSON WALTON OFFERS ALL THREE

EATON *2-Speed Truck* AXLES

Can Take It!

Ruggedness of design, plus such exclusive features as planetary gearing and forced-flow lubrication, reduce stress and wear to a minimum, add thousands of miles to axle life. Eaton 2-Speed Axles also add to the life of the vehicle and insure lowest cost per mile, particularly in the kind of service where extra pulling

power must be combined with speed. Because Eaton 2-Speed Axles provide the best gear ratio for every operating condition, they permit engines to run at most efficient speeds, and reduce strain on engine and power transmitting parts. Ask your dealer to explain how Eaton 2-Speed Axles will help your trucks do more for less.



Axle Division

EATON MANUFACTURING COMPANY
CLEVELAND, OHIO



PRODUCTS: SODIUM COOLED, POPPET, AND FREE VALVES • TAPPETS • HYDRAULIC VALVE LIFTERS • VALVE SEAT INSERTS • JET ENGINE PARTS • ROTOR PUMPS • MOTOR TRUCK AXLES • PERMANENT MOLD GRAY IRON CASTINGS • HEATER-DEFROSTER UNITS • SNAP RINGS • SPRING TITLES • SPRING WASHERS • COLD-DRAWN STEEL • STAMPINGS • LEAF AND COIL SPRINGS • DYNAMATIC DRIVES, BRAKES, DYNAMOMETERS



Illustration shows a 200-ft. coil of 2" pipe. Approximate weight, 90 lbs.

YARDLEY M-1 *Flexible* PLASTIC PIPE

End corrosion troubles for good. Use this tested plastic pipe that is resistant to acids and alkali. It is light, flexible and tough . . . withstands normal operating pressures and temperatures . . . cuts installation costs up to 60% . . . requires minimum maintenance.

Yardley M-1 pipe comes ready to use with accessories illustrated. Sleeve-type outside couplings quickly attached with stainless steel clamps. Warehouse stocks near most mining areas.

Made in 9 sizes . . .

Plastic M-1 pipe comes in standard iron pipe sizes: $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1 , $1\frac{1}{2}$, 2 , 3 , 4 and 6 inches. Sizes through 3" are coiled; 4" and 6" in straight lengths.

Write us for nearest distributor.



INSERT COUPLING



INSERT ADAPTER



ELBOW



TEE

YARDLEY
PLASTICS CO.

142 Parsons Ave.

Columbus 15, Ohio

ADams 9315

Other Yardley Plastic Pipe ▶ ▶ ▶

M-4

A heavy-duty flexible pipe similar to M-1 for high-pressure, suction and pumping applications.

M-3

A light-wall, rigid plastic pipe with cement-type fittings and thread adapter.

M-3-S

Similar to M-3 with heavier wall in standard iron pipe sizes, threaded and coupled. Complete line of plastic fittings.



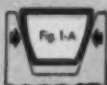
Here is *Exactly WHY* a V-Belt with **CONCAVE SIDES** Gives You *Longer Wear!*

What Happens When a V-Belt Bends

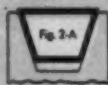
Straight-Sided V-Belt



Gates Vulco Rope with Concave Sides



Now Straight-Sided V-Belt Bulges in Sheave-Groove. Sides Press Unevenly Against V-Pulley Causing Extra Wear At Point Shown by Arrows.



The Concave Sides Fill Out to a Precise Fit in the Sheave Groove. No Side Bulge! Sides Press Evenly Against the V-Pulley -- Uniform Wear -- Longer Life!



To see for yourself how a V-Belt that has concave sides is certain to give longer wear, just make this simple test—

Pick up any V-Belt you have at hand. Bend that belt as it bends around a pulley. As it bends, grip its sides between your fingers. Here is what will happen everytime.

If the V-Belt you are testing has straight sides, you can feel those sides bulge out as the belt bends. This out-bulge forces the sides of the belt to press unevenly against the V-Pulley and you naturally get concentrated wear just where the bulge is greatest—as shown in figure 1-A, at left.

Now, make this same test with the belt that is built with Concave Sides—the Gates Vulco Rope!

Whereas you felt an out-bulge when you bent a belt with straight sides, you find that the Concave Sides merely fill out and become perfectly straight. The sides therefore press evenly against the V-Pulley. This distributes the wear uniformly across the full width of the belt. Naturally, this means longer belt life and lower belt costs for you!

Only V-Belts made by Gates are built with concave sides. Whenever you buy V-Belts, be sure that you get the V-Belt with the Concave Sides—the Gates Vulco Rope!

Gates Vulco Rope Drive on the Mine fan of Sloss Sheffield Steel & Iron Company, Birmingham, Alabama. The drive operated 24 hours a day for 3 years without down-time.

CS-517



Hose V-Belts
Molded Rubber Goods
For Industry

VULCO ROPE DRIVES

ENGINEERING OFFICES AND STOCKS
IN ALL INDUSTRIAL CENTERS

THE GATES RUBBER COMPANY

DENVER, U. S. A.

The World's Largest Makers of V-Belts

*Pardee and Curtin Lumber Co.
finds that*

Belt reinforced with "Cordura" Rayon troughs well on 1,500' slope conveyor

STRONGER AND MORE FLEXIBLE, this belt (above) reinforced with "Cordura" rayon hauls 200 tons an hour up a 134-foot lift on a 12 per cent maximum grade. It operates under maximum tension of 4,954 pounds, and is spliced with a Flexco #500 ring-type mechanical splice. (Below) Mine Superintendent Mr. Max Weaver with 4,229 feet of new belting reinforced with "Cordura" rayon which will soon replace sections of the present mother belt.



Whether carrying a maximum load or going up empty, this 30-inch slope belt at Pardee and Curtin's Bolair Mine #1, Bolair, West Virginia, trains perfectly all the way. It was manufactured by the Goodyear Tire and Rubber Company on a 4-ply fabric carcass made of Du Pont Cordura* High Tenacity Rayon.

Engineers at Bolair have used "Cordura" reinforced belting since 1947. They like its easy troughing, high strength, and minimum stretch. Recently they ordered 10,000 feet more to replace sections of conventional belting in the mother belt.

Why do belts reinforced with "Cordura" rayon train better? Because "Cordura" yarn is inherently stronger than yarn of natural fibers, manufacturers can make a belt thinner . . . with fewer plies . . . yet stronger. These thin belts are more flexible, trough better, have less tendency to crack and separate. Furthermore, their low stretch saves costly shut-downs for take-up and resplicing.

Before you order your next conveyor belt, be sure to inquire about the use of "Cordura" rayon in belts. We'll be glad to send you the names of suppliers of the new belts built on "Cordura." We'll also give you full information about this Du Pont fiber in a new booklet "Sinews for Industry." For your free copy, address: Rayon Division, Room 4421-C, E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Del.

*REG. U. S. PAT. OFF.

Du Pont *"Cordura"* High Tenacity Rayon
STRENGTH AT LOW COST



BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

**A MESSAGE
TO AMERICAN
INDUSTRY**

**"This is more than a shortage
... this is an emergency.**

Every pound of your scrap is needed, NOW !"



"THE STEEL INDUSTRY is currently operating at more than 100% of rated capacity—turning out well over 2 million tons of steel per week. This record high production—every ton of which is in urgent demand—cannot be kept up unless we get more scrap from every potential source. For without your scrap we cannot produce enough steel. Today, every ton of steel turned out requires a half a ton of scrap for its production. That's why scrap—more scrap—is so urgently needed, and needed right away.

"The fact we have to face today is that steel mills are operating on a hand-to-mouth basis as far as scrap is concerned. Some mills are working on only a two-day supply of scrap. We already have had to shut down steel-making furnaces for lack of scrap.

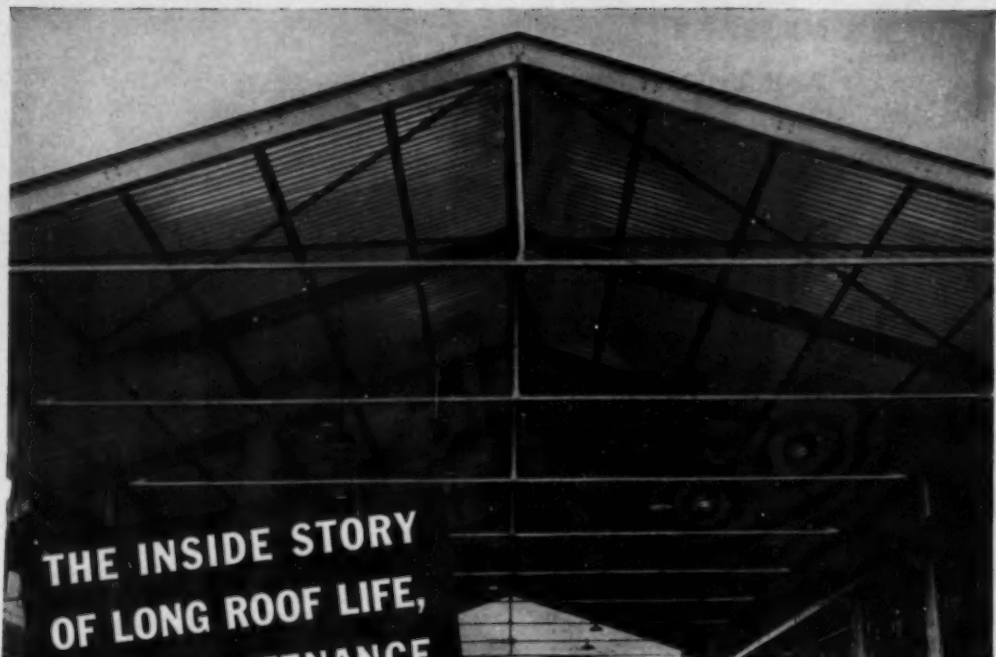
"That's why we are asking you to strain every effort to get more scrap out of your plants and yards and on its way to the mills . . . to search out the scrap that doesn't come to market in normal times. You'll find this "dormant" scrap in obsolete equipment, tools and machinery that you haven't used for years . . . overlooked in your storage sheds . . . or rusting away in a junk pile in some forgotten corner. It's there. Turn it in at once—so we can turn out the steel you need. We can't do it without your help."

B. I. Tailor

President, United States Steel Corporation



UNITED STATES STEEL



THE INSIDE STORY OF LONG ROOF LIFE, LOW MAINTENANCE

When the Sturtevant Air Handling Division of Westinghouse Electric Corp. planned a new warehouse at Hyde Park, Mass., they found they could save substantially on framing by using this strong yet light aluminum roofing. Weight is only 56 lbs. per square—see specifications for load-carrying capacity.

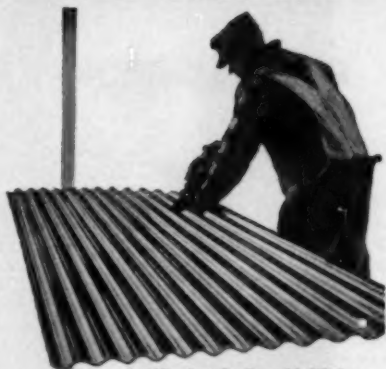
Ease of application further lowered initial cost. And the company looks forward to years of *minimum maintenance* with the rustproof, corrosion-resistant metal that needs no painting.

Workers will also find summer temperatures cooler under heat-reflecting aluminum...and lighting will be better under this bright ceiling. In *your* next building these two advantages may be even more important. In *any* building the rustproof permanence of aluminum must save you money.

For literature, technical assistance and application details, call on Reynolds.

• Offices in principal cities. Check your classified phone book for our listing under "Building Materials," or write: Reynolds Metals Company, Building Products Division, 2005 South Ninth St., Louisville 1, Ky.

Aluminum is required for planes and other military needs. Reynolds Lifetime Aluminum Industrial Corrugated is still produced, but the total supply is necessarily reduced. DO-rated orders receive priority handling.

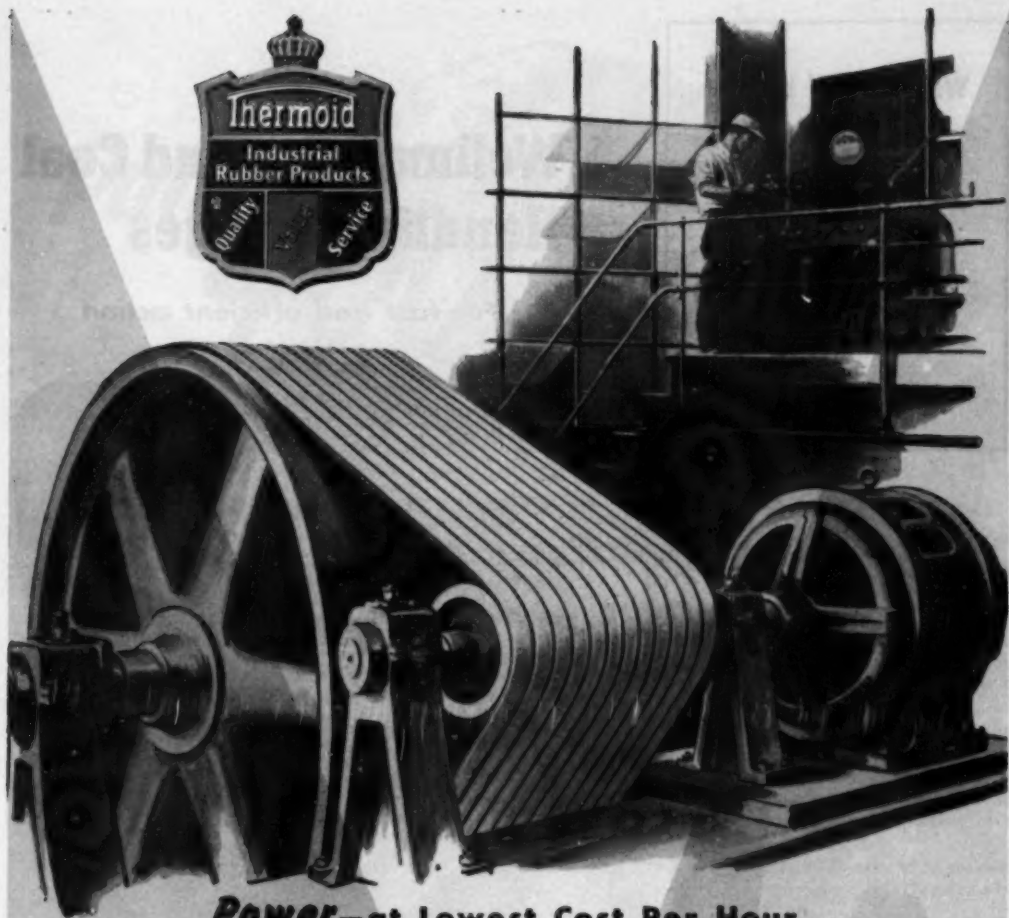


Specifications for Reynolds Lifetime Aluminum Industrial Corrugated:

Thickness .032"
Corrugations 7/8" deep, 2-2/3" crown to crown
Uniform load support (roof) 80 p.s.f. on 4' purlin spacing
Uniform wind load capacity (siding) 20 p.s.f. on girt spacings up to 7'9"
Roofing width 35", coverage 32"
Siding width 33-3/4", coverage 32"
Lengths 5', 6', 7', 8', 9', 10', 11', 12'



REYNOLDS *Lifetime* ALUMINUM INDUSTRIAL CORRUGATED



**Power—at Lowest Cost Per Hour
with Thermoid Multi-V Belts**

Thermoid Multi-V Belts are pre-stretched to insure maximum power transmission without adjustment. They are constructed for flexibility and ability to absorb repeated shock loads . . . thoroughly impregnated with special rubber compounds to withstand moisture and abrasion, resulting in longer belt life.

Thermoid Multi-V Belts are available in matched sets—uniform in size and cross section. Their longer life and non-slip performance add up to "Power—at the lowest cost per hour."

Your Thermoid Distributor can help you with your power belting problems—whether you need Multi-V, F.H.P. or flat transmission belts. For unusual belt problems, a Thermoid Field Representative is always available to give you the benefit of his experience.

Thermoid

Conveyors & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

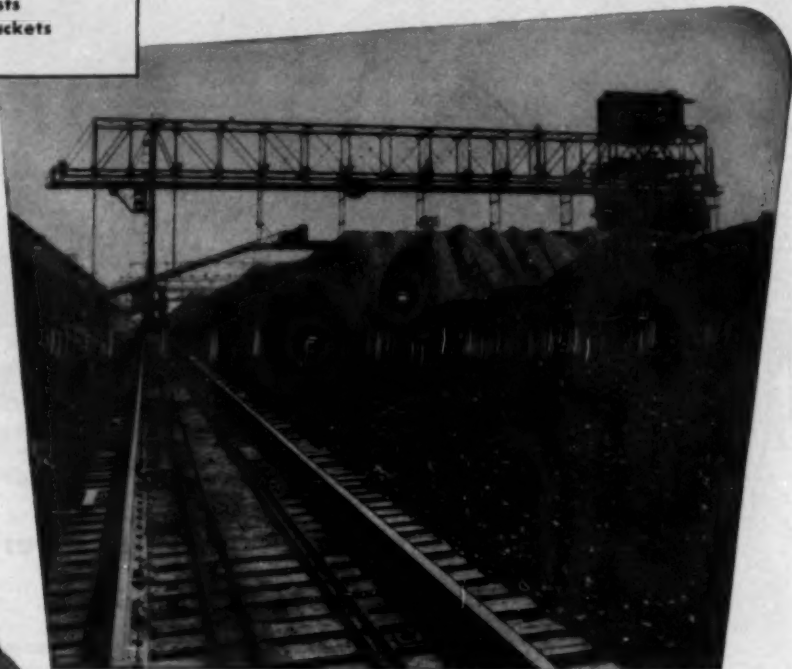
Thermoid Company • Offices & Factories: Trenton, N. J. Nephi, Utah

Wellman will build it

Special Cranes
Ore Bridges
Gas Producer Plants
Charging Machines
Industrial Furnaces
Car Dumpers
Gas Flue Systems
Gas Reversing Valves
Coke Pushers
Mine Hoists
Skip Hoists
Clamshell Buckets

Wellman Ore and Coal Handling Bridges

For fast and efficient action



One of two 6-ton Coal Handling Bridges in this installation.



6-ton Wellman Williams Type Coal Bucket used with these bridges.

• Take advantage of Wellman's long experience in designing and building handling bridges in many types and capacities. Your selection from the complete line will provide fast and efficient handling of coal or ore.

THE WELLMAN ENGINEERING COMPANY

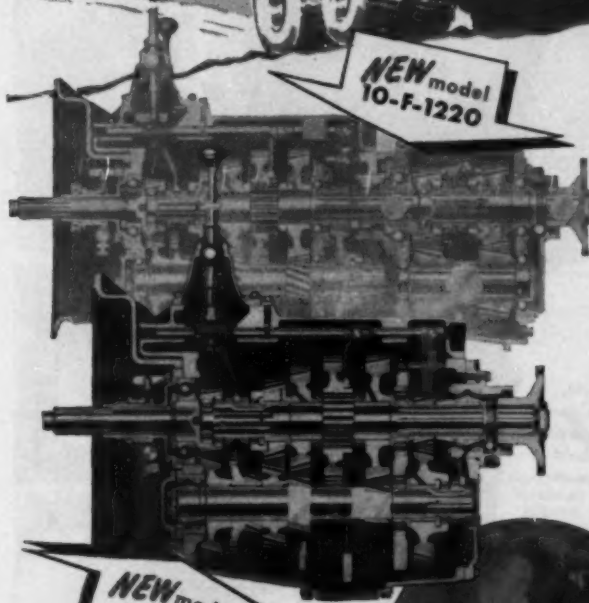
7007 CENTRAL AVENUE • CLEVELAND 4, OHIO

Puts

400 hp to work.



NEW model
10-F-1220



NEW model
5-F-1220

Here they are, the *new* Series 1220 Fuller Transmissions... even bigger, even better for the heaviest going than the famous Series 1120, heretofore the biggest in the field.

These new 1220 Series Transmissions already are being used behind the more powerful engines needed to move top loads over toughest grades... already are proving themselves in putting up to 400 hp to work.

The Series 1220 is offered in two versions—the 5-speed 5-F-1220 and the 10-speed 10-F-1220.

Both include all-helical gearing, short shifts, fast shifts, exactly the right gear ratios to keep engine rpm up. They include, in fact, all the features which make the 1120's so famous—plus the extra "beef"... to handle the extra horsepower.

To put 400 hp to work, on the toughest jobs, specify the Fuller 5-F-1220 or the Fuller 10-F-1220 *Heavy-Duty* Transmission. Write today for complete information on the *biggest in the field*.

Fuller
TRANSMISSIONS

where horsepower
goes to work

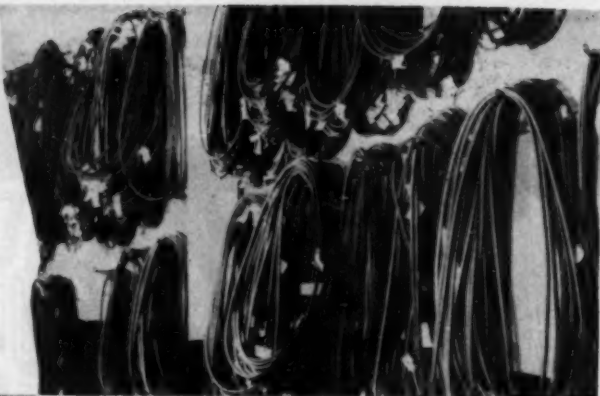


FULLER MANUFACTURING COMPANY, Transmission Division, KALAMAZOO 13F, MICHIGAN

Unit Drop Forge Division, Milwaukee 1, Wis. • WESTERN DISTRICT OFFICE (SALES & SERVICE—BOTH DIVISIONS), 1040 E. 11th Street, Oakland 6, Calif.

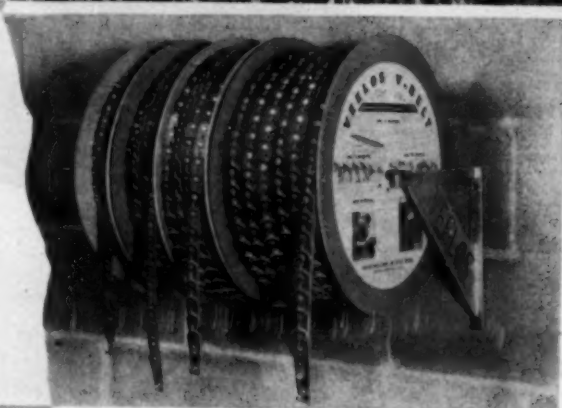
Why carry this Costly Inventory?

When you switch to Veelos—the adjustable v-belt—you end for all time the storage problem, the inventory control problem and the "frozen investment" problem that come with carrying this expensive, space-wasting stock of endless v-belts.



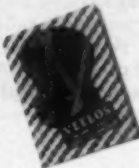
4 reels of VEELOS is your Complete Inventory

With just these 4 reels of Veelos you can take care of *every* v-belt need in the O, A, B and C widths—these 4 reels replace up to 316 sizes of endless v-belts... and you have the right size belt when you need it. There's no storage or control problem—inventory costs are at a minimum.

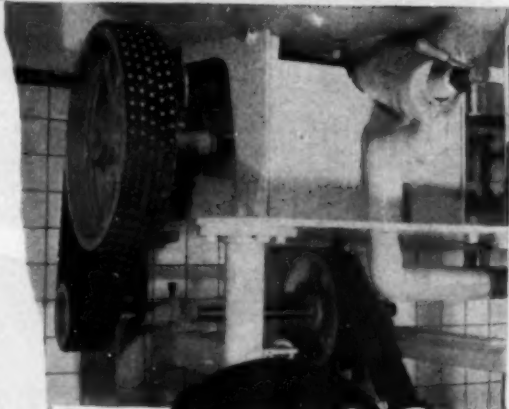


and VEELOS provides Peak Machine Production

Vibrationless, full power delivery—simple, easy adjustment to maintain uniform tension on all belts—quick installation (unnecessary even to dismantle outboard bearings) these are Veelos advantages that mean maximum production.



We have a copy of the
VEELOS DATA BOOK
for you—write today and we'll
send you this complete story on
Veelos—the adjustable v-belt.



ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

Made in all widths in three types: regular, oil-proof, static conducting. Also double V in A and B. Packaged on reels in 100-foot lengths. Sales engineers in principal cities; over 350 distributors throughout the country. VEELOS is known as VEELINK outside the United States.

MANHEIM MANUFACTURING & BELTING COMPANY • MANHEIM, PENNA.



BOWDIL

COAL CUTTER CHAIN and BITS

ONE-PIECE
BIT HOLDER

BOWDIL
BITS

BIT-CARRYING
BODY SECURELY
WELDED TO
CHAIN

HEAVY
SHOULDERS
ON LINKS
CARRY
LOAD

SET SCREW
LOCKS BIT
HOLDER

LARGE
HEAT-TREATED
PINS

Made by the makers
of the



**STRONGEST CUTTER-BAR
IN THE COAL INDUSTRY**

BOWDIL BITS
for lowest cost per ton

HEAVY-WALL
HARDENED
BUSHING

RADIAL
TRACE
GUIDES

DROP-FORGED
LINK AND
CONNECTOR

INGENIOUS
RIVET
LOCK

**THE BOWDIL
COMPANY**
CANTON, OHIO

Where in the world is all the coal coming from?



Today, the call is for more coal—still more coal—to make all the steel and the thousands of other things that go into ships and tanks and planes. And that's on top of all the coal used for power—by the railroads and utilities—in the factories—and for home heating. And remember, nearly 18,000,000 homes, more than half the homes in the country, depend on coal for heat. *Will there be enough to go around?*

The answer is YES, enough for every need—for this country's coal companies have led America to first place in world coal production—three times that of any other country.

America's leadership in coal is no accident. 92% of America's total fuel reserves are in coal. And progressive coal companies have equipped the U. S. miner with the world's most efficient mine machinery. Thus the American miner, today, has a daily output 4 to 24 times as great as that of any miner in Europe or Asia.

Out of today's giant preparation plants comes better coal. Fortunately, too, coal burning equipment has been greatly improved, so that one ton of this better coal, used under the

more efficient modern boiler, yields as much energy as did three tons—a relatively few years ago!

America's leadership in coal production is a direct result of free competition. The operators of this country's 9,000 privately owned coal mines have had to keep up with each other in efficiency or go out of business. In their competitive effort, the coal companies have invested hundreds of millions of dollars in research—in modern mining equipment and in developing new mine properties!

America's privately managed coal companies are doing a production job that no government-owned or dominated coal industry, anywhere, can begin to match!

BITUMINOUS COAL INSTITUTE
A DEPARTMENT OF NATIONAL COAL ASSOCIATION
WASHINGTON, D. C.

FOR NATIONAL DEFENSE  FOR PEACETIME PROGRESS

YOU CAN COUNT ON COAL!

OFF-THE-ROAD

ON-THE-ROAD

GENERALS

**Resist cuts, scrapes, bruises...
Give more traction! More speed!
More safety—**

WORK FASTER... LAST LONGER... COST LESS
**more profit
for you per job!**

GENERAL L. C. M. Broad, deep, self-cleaning tread lugs and reinforced shoulders for more traction off-the-road. Longer wear on razor sharp mine and quarry surfaces.

**THE
GENERAL
L.C.M.**

**THE
GENERAL
H.C.T.**

GENERAL H. C. T. for most work on-the-road, some off. More rubber, more cords per inch for greater safety. Extra traction through sand, gravel, slush, mud.

**GENERAL UNDERGROUND
MINING TIRE**

Extra strong, extra thick rubber at the shoulders. Resists cuts, snags, bruises. More traction. More wear.

REQUEST GENERAL TIRES ON YOUR NEW EQUIPMENT



Feed end of picking table... one of worst dust sources prior to ROTO-CLONE installation.

efficient dust control...

ROTO-CLONES LOWER FUEL COST FOR WEST PENN POWER

WEST PENN POWER had a two way problem... coal dust and BTU loss! Quantities of coal for power production are transferred from mine... to tippie and crusher house... by a tunnel under a river. The highly mechanized transfer and processing operations developed several drastic dust sources that necessitated control. Water sprays for dust suppression proved costly, as the processed coal was wet, reducing BTU values.

AAF Type N ROTO-CLONES*, exhausting 44,000 cfm, provided an efficient, economical answer to

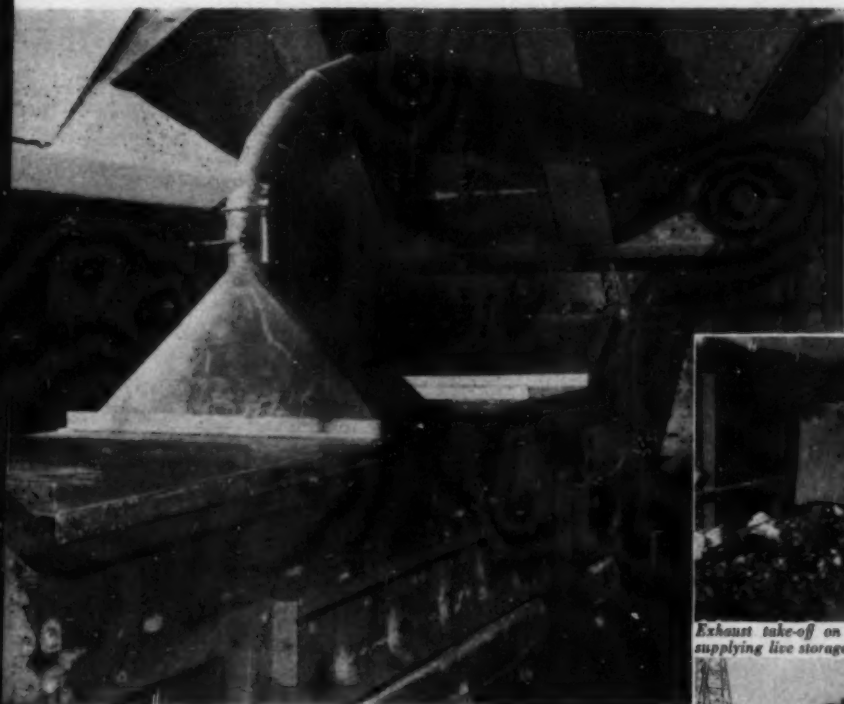
this two-way problem. The photographs of typical Type N exhaust points indicate the high efficiency of ROTO-CLONE dust control. The feed end of the picking table, for instance, used to be one of the worst dust sources. Now both human and mechanical efficiency have been improved by *clean air*... and valuable BTUs are no longer lost, but *saved*.

This is only one example of how ROTO-CLONES effect savings through efficient dust control. If dust is dissipating your operating dollars, be sure to consider ROTO-CLONES for a practical

solution. The many types, sizes and arrangements have solved almost every dust problem in the mining and processing cycle.

For full information (including case histories) see your nearby AAF representative or write direct to the company.





Hood over oscillating feeder.



Exhaust take-off on discharge to Belt Conveyor supplying lime storage.



West Penn Power Company Plant, Springdale, Pa.

. pays off in BTUs

The **TYPE N ROTO-CLONE** is a dynamic precipitator of the hydro-static type providing these performance characteristics:

- High efficiency in collecting both coarse particles and extreme fines in excessive concentrations.
- Dust collected in the hopper may be sluiced either continuously or intermittently.
- Continuous operation at peak

efficiency without interruption for reconditioning.

- Minimum space requirements as single units perform functions of both exhauster and dust collector.
- Uniform air delivery assures sufficient air flow at hoods and unvarying air velocities in ducts at all times.
- Shop assembled and pre-tested for ease of installation.

***ROTO-CLONE** is the trade-mark (Reg. U. S. Pat. Off.) of the American Air Filter Company, Inc., for various dust collectors of the dynamic precipitator and hydro-static precipitator types.

American Air Filter

COMPANY, INC.

267 Central Ave., Louisville 8, Ky. • In Canada: Darling Bros., Ltd., Montreal, P. Q.



Cross section of Type N **ROTO-CLONE** arrangement D with dual impeller showing water curtains created by air flow.

MANITOWOC

3500

TOPS 'EM ALL in SPEED - CAPACITY - PERFORMANCE



Here's a big, rugged machine with stability unsurpassed in its size range. Stability that means big loads with long booms (60 tons at 12' radius); that means long reach with full capacity buckets on dragline work; stability that means ability to handle extra-long booms up to 140' for crane service.

And when you compare working speeds, digging cycles, construction features, service accessibility, the 3500 tops 'em all . . . that's why it's top choice among users who've tried 'em all.

And it's available to meet your exact needs, as a shovel, crane or dragline; optional choice of crawler lengths; long or short booms; independent boom hoist or swing; choice of power plants; air or manual controls. Send for complete details today. Manitowoc Engineering Works, Manitowoc, Wisconsin.

MANITOWOC

SHOVELS

1-5 YD.

Steel Line

CRANES

18-100 TON

PLUS TORQUE CONVERTER DRIVE

PRECISE CONTROL

"Fraction of an inch" control by either hand throttle or foot accelerator, without slipping clutches or shifting speeds.

SMOOTHER OPERATION

Cushion of oil absorbs jarring impacts which saves cables, clutches and machine assemblies.

BALANCED POWER-LOAD

Engine operates at maximum efficiency at all times . . . full engine power under full load, just enough power for light loads . . . assuring economy of operation. Engine cannot stall and develops full "digging" power. Load requirements and engine horsepower always automatically balanced.

INFINITE SPEEDS

No gears, but all the advantages and none of the disadvantages of automatic, multi-speed transmissions. An infinite number of speeds at your command without shifting. Since speeds and power are automatically balanced at all times.

From Start to Finish... **YOU'RE TIME ^{AND}
MONEY AHEAD**



with
**Firestone
TIRES**

WHEN you start a job, you want to get it done in the shortest possible time at the lowest possible cost. The kind of tires you use has a lot to do with both.

When you buy Firestones, you pay no more than you do for other tires. But you **GET** more — more rubber in the treads . . . You get double-thick, cut resistant sidewalls. You get four extra plies that protect the Gum-Dipped cord bodies, which can be retreaded again and again. And you get more service from your Firestone Dealer or Store.

Add up these advantages. They mean more hours of service . . . less delays and downtime. You're time and money ahead with Firestone Tires on your equipment.

Enjoy the Voice of Firestone on radio or television every Monday evening over NBC

Copyright, 1951, The Firestone Tire & Rubber Co.

**ALWAYS SPECIFY FIRESTONE TIRES
WHEN BUYING NEW EQUIPMENT**



**PLAN
LOAD
DETONATE**



The many advantages of Primacord make it the choice where safety, simplicity of hookup, and ease of handling are factors to be considered.

Primacord, because of its speed, detonates practically instantaneously, yet the infinitesimal lag between holes and rows of holes obtains greatest results from a minimum quantity of explosives.

Because it cannot be set off by friction, sparks or ordinary shock and is impervious to stray electrical currents, Primacord offers a safety factor to many blasting operations.

Primacord is wound on easy to handle lightweight spools, so that loading and hook-ups are done easily.

4 Types of Primacord

Primacord is made in four standard types, each designed to obtain greatest effectiveness under varying working conditions — each with the same high degree of dependability.

PLAIN PRIMACORD. For shallow holes and surface trunkline use, Plain Primacord is recommended. Although light in weight (a 1000-foot spool weighs only 19 lbs.) it has tensile strength of 113 lbs.

REINFORCED PRIMACORD. For deep holes where extra tensile strength or resistance to abrasion are desirable, depend on Reinforced Primacord. Tough,

but resilient and easy to handle, Reinforced Primacord has the same detonating qualities as other Primacord-Bickford types. Weight 20 lbs. per 1000-ft. spool.

WIRE COUNTERED PRIMACORD. Armored with closely stranded brass wire, Wire Countered Primacord is the answer to problems involving deep, ragged holes and high abrasive conditions. The wire sheath also increases the tensile strength to 220 lbs. Weight per 1000-ft. spool, 35 lbs.

PLASTIC REINFORCED PRIMACORD. To meet the demand for a strong, waterproof detonating cord resistant to abrasion and to the acids commonly encountered, Ensign-Bickford developed Plastic Reinforced Primacord. With tensile strength of 250 lbs., users find it ideal for extremely deep holes, river crossings, or where water is a problem. Weighs 22 lbs. per 1000-ft. spool.

Blasters who use Primacord consistently agree there is no substitute. For complete information, consult your explosives supplier . . . or write to us direct.

THE ENSIGN-BICKFORD COMPANY
Simsbury, Connecticut

Also Ensign-Bickford Safety Fuse — Since 1836

P-51
PRIMACORD-BICKFORD

**Detonating
Fuse**

AUGUST, 1951

IVAN A. GIVEN, EDITOR

Inside and Outside

IF THERE is any widespread feeling that the stoker is washed up as a means of keeping coal in the domestic market, two recent comments—one from inside and the other from outside the industry—should provide good reason for reappraisal of the situation. From inside coal, Julian Tobey, president, Appalachian Coals Inc., at the meeting of the Stoker Manufacturers' Association June 25, had this to say:

"Stoker sales hit bottom last year but are now gradually increasing. Sales for the first quarter of 1951 showed an increase of 70% over 1950. While the sales volume was small, a 70% increase in any business is indeed a creditable showing and indicates progress. It is interesting to note that Class I bituminous stokers (small residential) held their own and were even slightly above the average increase of all classes. Class III stokers (for apartment houses and general small commercial heating) ranked second in percentage of increase for the first quarter and practically equalled Class I."

Major factors in the upsurge in stoker sales, said Mr Tobey, are tight situations for competitive fuels and increases in their prices. This was confirmed in a report in the June issue of *The Iron Fireman Magazine*, in part as follows:

"Iron Fireman stoker sales are on the way up this year. Sales to date this year are 106.7% ahead of figures for the same period a year ago. Dealers are reporting increased interest in both domestic as well as commercial-industrial stokers, and increased sales volume. Reasons for the sharp rise in stoker sales this year can be chiefly attributed to gas restrictions throughout various areas of the country and also to the high price of oil in other sections. More and more prospects for

automatic heating are now seriously considering coal firing."

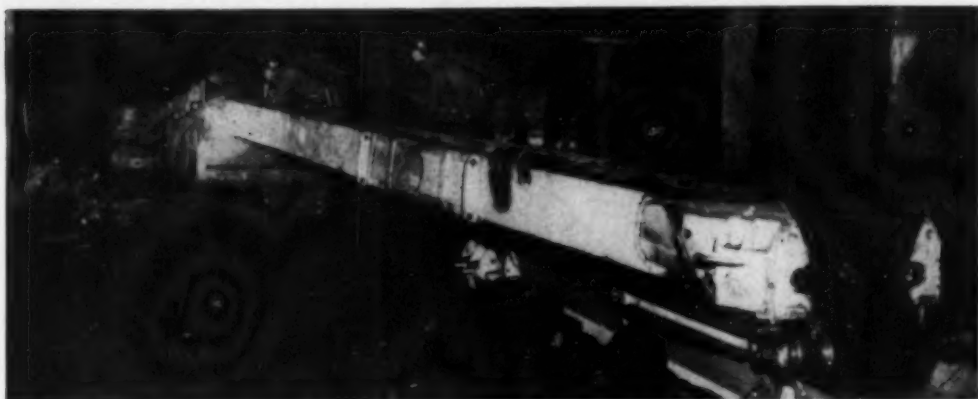
Iron Fireman exhorts its dealers to get on the ball and cash in on the interest in modern automatic heat with stokers. Mr. Tobey asks for the design of a small efficient low-cost stoker unit and more cooperation between the coal and stoker industries in promoting stoker sales. A further message might be addressed to those in the producing end of the business: low cost and high quality are powerful arguments when a stoker sale is being made. The changing stoker picture is one more bit of evidence that coal's opportunities are broadening. It should miss no chance of cashing in on them.

Turnabout

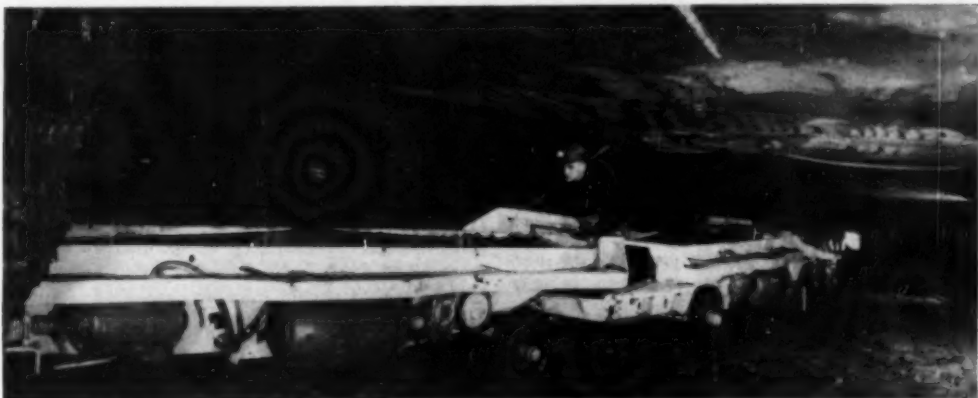
STEEL is a coal-mining mainstay. It also is the mainstay of many other of the major industries in the United States, and of course is a critical military material. The defense effort, superimposed on essential civilian needs, is straining the productive capacity of the steel mills and in turn is drawing down the supply of scrap, without which steel cannot produce. The lesson is clear. If coal is to have the steel it needs, it should exert itself to return all the scrap it can to the mills.

Compared to a normal 60-day supply, scrap inventories are now at dangerously low levels. And this year, the mills will need about 32,500,000 tons of scrap—some 3,500,000 tons more than last year's record. Next year, they will need over 35,500,000 tons. These additional tonnages of scrap do not have to be manufactured. They need only to be found. Coal men can do their part by getting the scrap to the nearest dealer, thereby helping themselves as well as the defense effort.

TRANSPORTATION—Vital Factor in Automatic Coal Mining



BRIDGE CONVEYOR provides continuous link to room conveyor and makes production continuous with standard machines.



ARTICULATED CONVEYOR serves mining and loading machines and can follow around corners while delivering to the main haulage.

Automatic Mining

How Coal Mining Stands Today Where the Opportunities Are What the Basic Approach Is

"WHY DON'T THEY MAKE a machine that will go underground by itself and bring out the coal?" One answer might be: "Who's crazy now?" Nevertheless, exactly such a machine has been talked about and reportedly some work has been done on the idea in the not-too-distant past.

The pushbutton era, however, is not to be expected in coal mining

tomorrow, though, as time goes on, the approach to it will be accelerated. The closer the industry comes to automatic mining—on the surface as well as underground—the more of its problems it will shed, since a major part of these problems revolves around cost, which in turn reflects labor.

All this, of course, is predicated on machines that will produce a

reasonable tonnage per unit of time in terms of cost of purchase and operation, including power, supplies and maintenance. A machine for complete automatic mining very likely could be built today, but at a prohibitive cost for purchase and operation. Therefore, the problem becomes one of machines—and materials and methods to go with them—that will reduce all cost to a minimum and at the same time will not in themselves be excessively expensive. All in all, the problem is a tough one, but not necessarily insoluble on a practical basis, given time, materials and the requisite brainpower.



SERVICE AT ALL TIMES when coal is flowing is provided by conveyors and modern mine-car haulage.



EXTENSIBLE SHAKER with steel belt offers long-distance possibilities.

Where We Stand Today

How close to automatic mining are we now? And—perhaps more to the point—how much closer can we get in the immediate future in the light of present knowledge? Ultimately, as noted, the goal might be specified as a reasonably priced machine that would go underground to bring the coal out by itself. Or, as alternatives, the energy in the coal might be recovered by gasifying or liquefying it in place and then sucking or pumping it out. Experiments with gasification already are under way, and methods of dissolving or liquefying coal have and are being studied, though perhaps not with the idea of doing it underground. Finally, if the pitch is right and other conditions are favorable, something that would break up the coal continuously so that it

could run out by gravity would be a means to the same end.

Mining naturally cannot be completely automatic if only one phase, such as loading out of the solid, is automatic or nearly so. Everything else from the face to the railroad car must operate continuously—or nearly so—with no labor or a bare minimum to qualify under the definition. In fact, the sudden increase in the importance of continuous transportation as a means of boosting tons per man, particularly at the face, is forcing a closer approach to automatic haulage, or at least haulage is always ready to take coal from the face units.

Recognizing, therefore, that a condition where the president would merely push a button and then go out for an 8-hr lunch is more to be dreamed about than expected, what is the situation today

and what are the prospects for the future? Today's situation stacks up about as follows:

1. Hand Mining—This type of mining uses the minimum of machinery and the maximum of hand labor all along the line, particularly in loading. Some degree of automaticity is possible through concentrating loading on a single face and providing continuous transportation or special car-changing facilities. Nevertheless, hand mining is the least automatic of all, since it emphasizes manual labor rather than machinery, and—above all—is necessarily an intermittent process. No process where the flow of material must be interrupted can be called automatic. And only when the flow is continuous or nearly continuous is it possible to reduce labor to the minimum. Consequently, with a few rare exceptions, hand mining is the most costly of all types employed today.

2. Machine Loading—By substituting a machine with operator and helper for a much-larger number of hand loaders, it is possible to attain greatly increased efficiency in terms of tons per man in the face area. But is the process automatic—or even partially so? The answer is, in the main, "No," though the loader works automatically once it is started. However, it cannot find its own coal and cannot dig out of the solid. In other words, it must be guided by the operator and requires a number of auxiliary operations before it can produce.

Mining with the conventional loading unit also is an intermittent process. The coal must be cut, drilled and shot, meaning that loading must be stopped during

Free Flow of Coal From Machines Fosters Automatic Production

this process and the machine left idle or moved to another place. Transportation also may be intermittent, again stopping the loading operation and in turn the flow of material. As a result of these disadvantages—if they may be called that—few machines are able to load coal more than one-third of the available time, though there are methods and means that can materially increase production time. Some of these will be outlined later in this discussion.

3. Continuous Mining—By eliminating all face preparation—except roof support, dust control and the like—and by continuous advance in a single place, mining-and-loading machines, otherwise known as "continuous miners," are providing a closer approach to automatic mining. But while the machines are nearly automatic in that they will dig and load with only guidance from the operator, the process becomes automatic only when continuous transportation is provided. This fact, which was highlighted by the advent of machines of this type, underlies the present active efforts being directed toward development of continuous or nearly continuous transportation. As a by-product, the concentration on continuous or nearly continuous transportation also is rebounding to the benefit of conventional loading units.

4. Stripping—In the sense that it is possible to use large, high-capacity equipment and thus reduce labor for direct mining, stripping represents a fourth approach to the problem of automatic mining. In addition to reducing labor through big equipment, stripping also eliminates the need for roof support, ventilation and a number of other operations required in underground mining by present methods. Consequently, within reasonable limits to thickness of overburden handled, it is the cheapest form of coal mining today, though it may be challenged by continuous mining underground at some future date—perhaps not too far off.

Automatic Possibilities

Conceding once again that true automatic mining is something that may never come to pass, what steps can be taken to attain a closer approach to that overriding goal. The major ones are two in number:

1. Taking a look at each mining operation requiring a man to see

if (a) an available machine, material or method can be substituted, or (b) to see if a machine, a material or a method can be developed at a reasonable cost if not now in existence.

2. Eliminating every possible stoppage or interruption in the flow of coal from the face to the railroad car.

Manifestly, a machine cannot be substituted for every manual operation coal mining—at least at the present time—and consequently the best that might be attained now is what might be called semi-automatic mining, with some operations almost completely automatic and others requiring hand work. Many maintenance operations are examples of the latter, along with construction of ventilating structures, inspection of mines, and so on and so on. However, as will be noted later in this discussion, there is the possibility that certain changes in mining techniques eventually would materially reduce the hand work required for at least some of these operations.

Eliminating interruptions may not always be a matter of a continuous and continuously operating series of equipment units. For example, the larger the mine car or shuttle car, the fewer the interruptions in the loading process and the closer the approach to automaticity. The same applies to trucks for hauling coal in stripping, with the added advantage that operating labor is reduced correspondingly.

To cite another actual instance of some of the possibilities of a noncontinuous system, one mining operation recently completed a program of haulage modernization and rearrangement of trip service to shuttle-car transfer stations, the latter involving big locomotives and big trips, with less manpower and fewer trip changes. As a result of reducing delays at this point, as well as in delivery of trips from the main line, production per loading unit was increased 93 tons per shift in the first month after improvements were completed. In addition, the number of men required to operate the main haulage was reduced from 14 per shift to 6 per shift.

Machine Loading—Though the conventional loading unit can be termed "automatic" in a limited sense only, and mining with it is necessarily intermittent, it provides a healthy increase in tons per man simply by substituting mechanical power for human mus-

cle. Mere installation, however, by no means exhausts the possibilities, since operation in accordance with basic principles provides an additional increase in productivity equal to or greater than the original. Some of these basic factors are:

1. A mining plan that prevents or reduces production interruptions. This means concentration of working places and keeping moves to a minimum. It means providing the maximum tonnage of coal in a single place, either by deeper cutting or by widening or lengthening the place, with semi- or full longwall as a logical end point.

2. A balanced working cycle. This is one of the major means of preventing the interruptions that reduce the output of loading units. In other words, face preparation and other face operations should be conducted so that coal is available for loading at all times.

3. Good transportation. This is the second major means of preventing loss of tonnage as a result of interruptions in the loading process. Where the conventional rolling stock (mine cars or shuttle cars) is employed, this in turn means (a) the use of the largest possible unit, and (b) a changing system that reduces the wait between cars to the lowest-possible minimum. In addition, of course, the haul should not be so long as to require the use of additional cars or make it impossible for one changing unit, where two are employed, to get back to the changing point before the other is loaded.

It is true that the high capacity of the conventional unit is such that the effects of transportation delays are reduced. However, if the closest-possible approach to automatic mining is desired, these are some of the basic principles. In addition, as will be detailed later, the operator also has available a number of new transportation devices that materially reduce loading interruptions.

Continuous Mining—For the reason previously noted, the new combination mining-and-loading machines provide the closest present approach to automatic mining. These machines include the big coal auger. While maximum recovery is limited, the auger is simple, relatively inexpensive, requires a small crew and reduces the roof support, ventilation inspection and other operations necessary with other types of equip-

ment. For these and other reasons, the big auger commands widespread interest at the present time.

The big auger may also provide one of the answers to economical extraction of coal on pitches, in addition to its present applications in flat work from strip pits and underground. There are at least two possibilities in the application of augers to pitch work: (1) use of the auger alone, and (2) drilling holes, at say, 10-ft intervals and shooting out the rib by smaller long holes. In addition, considerable headway is being made in the use of small holes, either in individual pillars or of a much longer nature, in recovering pitching coal by substituting machinery, explosive energy and gravity for hand work.

Continuous Transportation—

While properly a service activity, transportation is so vital to the success of either loading or continuous mining that it is logical for it to be considered a part of these activities. In short, no matter how automatic the loading or mining unit may be, failure to take the coal away as fast as it is produced reduces the benefits of automatic operation in exact proportion.

The transportation system need not be continuous in the sense that it runs all the time to be classed as automatic. The test is service each and every time the face unit puts out coal—in other words, no interruptions in face production. With conventional loading units, mine-car and shuttle-car service is providing excellent results, although even with these machines some of the newer ideas based on conveyors hold forth real promise on the basis of initial installations. With combination mining-and-loading machines, especially in view of the relatively low capacities presently available, continuity becomes an even more important consideration. Otherwise, the full potential of the miner as a labor saver is not realized. Ideas for greater continuity, meaning greater automaticity, include the following:

1. Bridge conveyors in conjunction with standard room conveyors behind bobtailed loaders or combination mining and loading units. The transportation system thus is made continuous, spillage and jockeying for position are eliminated, and the operator can devote his entire attention to the No. 1 job—loading.

2. Cascade, continuous-extensible or articulated conveyors be-

hind either loaders or continuous miners. The first and the last, in particular, can follow the machine around curves and corners. And, if expectations as to ultimate length are realized, the continuous-extensible unit of the shaking type with storage reel and stainless-steel strip for the carrying member also can help open up new horizons in service to face equipment. All three, as well as the bridge conveyor, make possible a close approach to automatic mining at the face, especially when used in conjunction with continuous units.

Beyond the working section, continuity in transportation is equally important but in some ways is easier to secure. Whether the system operates continuously (conveyor) or intermittently (mine cars and locomotives) the goal is availability whenever there is coal flowing. Naturally, the less the labor required, meaning the closer the approach to automatic operation, the more desirable any particular system becomes—within, of course, reasonable limits as to investment cost.

Service Questions

The problems involved in attaining automatic operation in face work and transportation have been and are tough enough. Other service operations, however, confront coal-mining men and manufacturers with something even knottier. For example, though certain types of machines are helpful adjuncts, not too much can be done at this time in substituting them for hand work and individual judgment in building stoppings, laying pipe, constructing haulways, supporting roof and many other mining activities.

There are possibilities for the future, however—some perhaps fanciful and some perhaps not. For instance, the possibility of shooting a bolt into the roof is conceded—if not the probability. Thus it might come about that the combination miner and loader of the future would be equipped with guns that would handle the bolting almost completely automatically.

Then there are the possibilities that might flow out of a change in present thinking on various mining practices. To take ventilation as a case in point, stoppings are required because ventilating equipment and aircoursing methods make them the best answer

to circulation and safety problems. Perhaps, it has been suggested, the old and much-frowned-upon method of ventilating with compressed air might be modified so that a miner would pull a high-pressure hose after it, getting positive circulation at the point where it is most needed and at the same time eliminating the need for most of the crosscuts now required. With considerably fewer working places and only a minimum of crosscutting, a high-pressure system from the surface or other logical source might turn out to be the more economical.

Even with no changes in present practices, quite a bit can be done with new materials and new auxiliaries already in existence or to be expected in the future. Light pipe and quick couplings are two examples. Shooting anchors for wire and equipment into the top, into steel or wood timber, into concrete walls or pillars, and so on, is another. New coatings for roof support and sealing of stoppings, overcasts and the like is another. As with direct mining, the key is examining each operation to see if a new material, a new tool, a new part or a new method will eliminate or reduce hand work.

Goal and Approach

Automatic mining, provided it can be attained with a reasonable investment in equipment, means less hand work and consequently a lower cost. In fact, reducing hand work is by far the best means of getting substantial cost reductions quickly. And with low cost, as previously noted, many of the industry's problems will disappear or at least will offer only minor difficulties.

A fair degree of automatic operation is possible even now, and the opportunities will broaden in the future. Every mining man and every man in the industries serving the coal industry, has an opportunity in fostering automatic mining. The keys, to repeat, are:

1. Taking a look at each mining operation requiring a man to see if (a) an available machine, material or method can be substituted, or (b) to see if a machine, a material or a method can be developed at a reasonable cost if not now in existence.

2. Eliminating every possible stoppage or interruption in the flow of coal from the face to the railroad car.

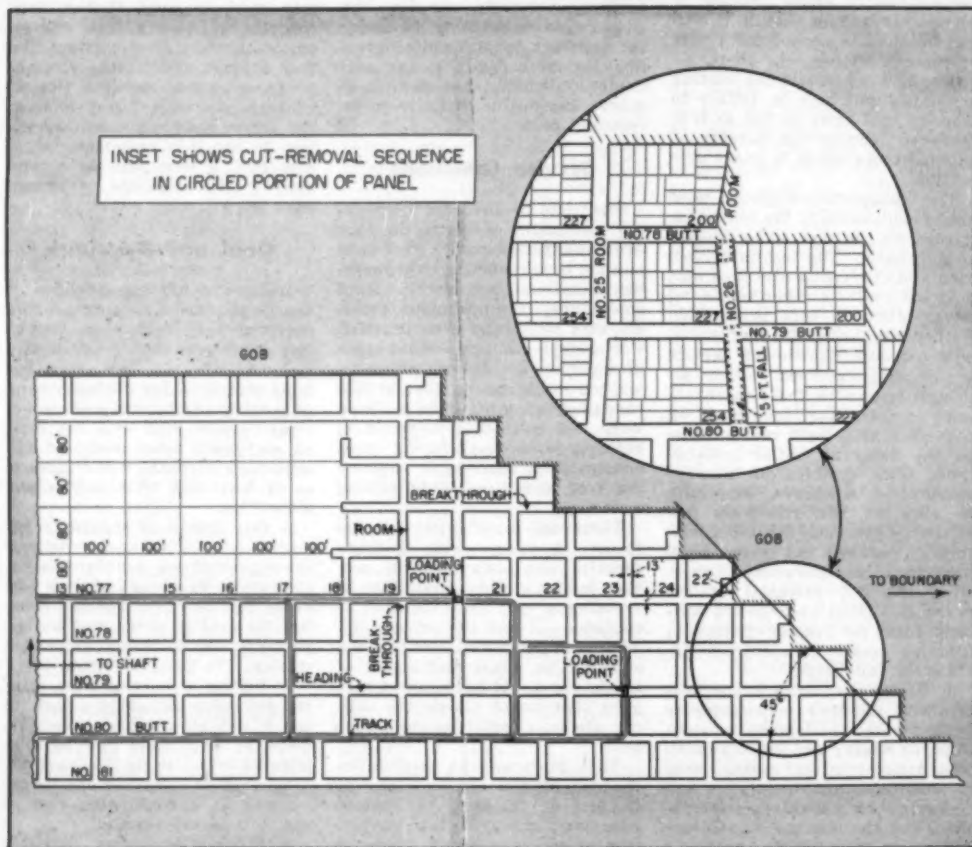
How Modern Machines, Methods and Ideas Promote Economy at Renton . . .



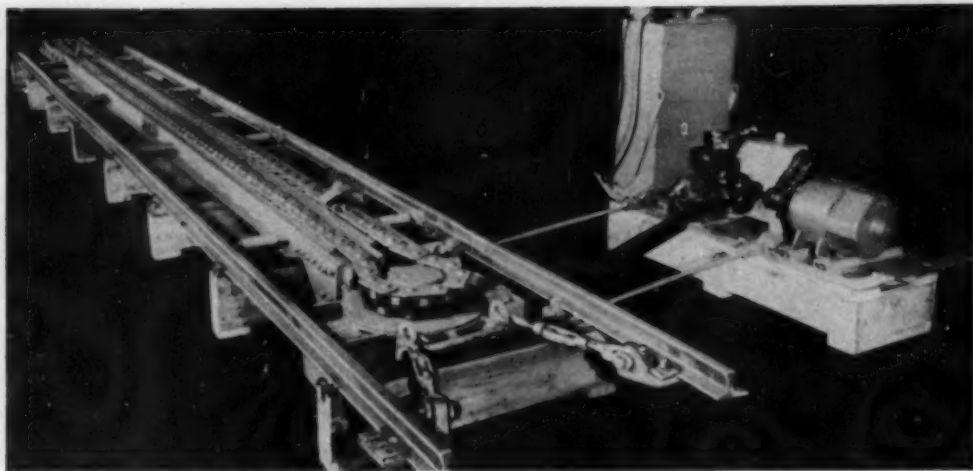
WELDED-ON TAILPIECE increases shuttle-car capacity to match mine-car capacity. Single car serves loading machine.



SHUTTLE CAR discharges to 9-ton steel mine car while operator controls car feeder by push button near his cab.



LOOP CIRCUITS simplify haulage by reducing switching while keeping cars right-end-to. Open-end cuts are removed from pillars according to a numbered sequence to provide close control of the breakline.



NEW CAR FEEDER, shown here in a shop photo, features positive drive and adequate power for heavy duty. A limit switch on the drive assembly controls chain reversal at the end of each stroke.

Economical Panel Mining

- Large Mine Cars, Efficient Car Feeders and Prefabricated Switches Spur Production at Renton No. 3
- Modern Methods and Up-to-Date Equipment Keep Costs Down and Production Up

THREE MAJOR FACTORS contributing to successful operation at Renton No. 3 mine, Pittsburgh Coal Co., Renton, Pa., are:

1. The use of high-capacity steel mine cars spotted at loading points by new electrically-driven reciprocating-chain-type car feeders.

2. The efficient use of conventional loading-machine-shuttle-car mining units.

3. The adoption of a well-planned system of mining which permits high recovery with good roof control.

The daily output of 30 production units at the mine (10 units, three shifts) is about 3,500 tons.

Here's how Renton does it, together with some "cost-cutter" ideas:

1 Big Cars and Better Spotting

Eight-wheel, all-steel, 9-ton Lorain mine cars, equipped with Willison automatic couplings, have been installed at Renton to provide

track-haulage units with a capacity to match that of the shuttle cars. Track gage is 48 in.

At three of the loading points, Nolan Porta-Feeders spot the mine cars at the shuttle-car discharge station, with the shuttle-car operator controlling the action of the Porta-Feeder from a push-button station he can reach from his seat.

The Porta-Feeder track unit consists of a main frame which sets atop the ties; aligning and bracing struts to hold the unit in place; and the sprockets and chain which move the cars. The chain carries two projecting dogs which engage the well of the car, not the axles.

In operation, one dog comes forward pushing a car, while the other retreats to pick up the next car. Then the chain reverses and the rear dog comes forward.

The power unit consists of a Louis Allis 5-hp motor, a speed reducer, control cabinet and a propeller shaft with universal joints for angular transmission. Re-

versal is controlled by a limit switch chain-driven by an auxiliary shaft from the speed reducer. Drawbar-pull developed by the unit is 6,000 lb and chain speed is 25 fpm.

Robert Penman, mine superintendent, estimates that in 4 hr four men can move the Porta-Feeder to a new loading point and have it ready to operate. This does not include the time required to prepare the new site. Previously, the power unit has been recessed into the floor to permit straightline operation of the propeller shaft, but now units are set up so that propeller-shaft dip from horizontal does not exceed 20 deg, thus cutting the time required to prepare the new site.

The length of the track unit is approximately the length of a car plus 7 ft, and the entire assembly can be moved on a mine truck.

Experience to date at Renton shows that trip-changing time is reduced because there are no ropes to be handled by the haulage crew. Also, extra labor at the loading point is eliminated and maintenance is low.

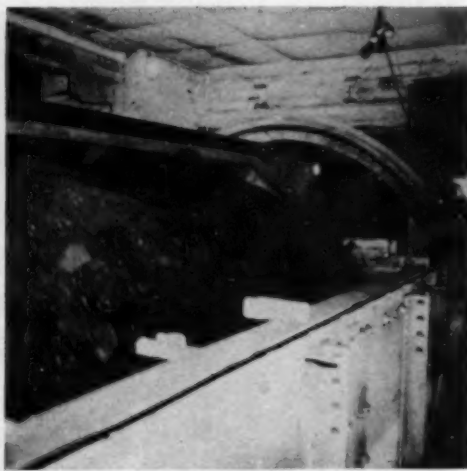
2 High Unit Production

Each production unit at Renton No. 3 includes a Joy 8-BU loading machine, a single Joy 10-SC shut-

How Good Machines Geared to Effective Methods Promote Better Mining



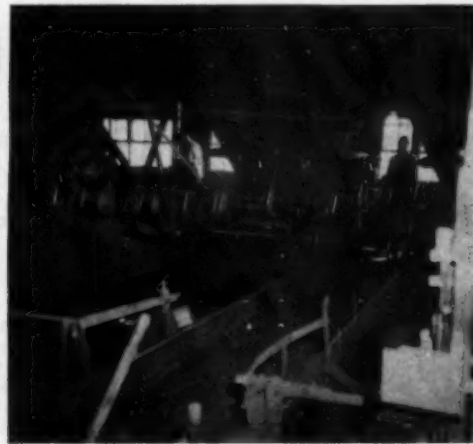
RUBBER-TIRED CONVERSION of track-mounted machine has 12-ft bar for making deep center cuts in narrow work.



ROTARY DUMP at foot of shaft adapts small shaft to big-car haulage. Cuttings and coal are hauled and hoisted separately.



RENTON VISITORS—J. Smith (left), superintendent, Hubbard mine, Greensburg Connellsville Coal & Coke Co.; Robert Penman, superintendent, Renton No. 3; G. W. Merritt, vice president, and



G. Hutchinson, Pittsburgh representative, The Nolan Co.; and F. Waggett, general superintendent, Greensburg Connellsville. Refuse gates on jigs (right photo) are controlled by photoelectric cells.

tle car and a converted-to-rubber Jeffrey 29U cutting machine with 12-ft bar. Chicago Pneumatic coal drills round out the list of major face equipment.

The crew of each unit consists of seven men, as follows: loading-machine operator, cutting-machine operator, scraper, shuttle-car operator, driller, timberman and shotfirer. Usually an assistant foreman supervises two crews.

Operations at Renton are in the Twin Freeport seam—7 ft of clean coal separated by a lower-quality 14-in parting between the two benches. The parting is cut out in

two passes of the cutting machine and cuttings are loaded out before the coal is shot.

A "cost-cutter" noted by Robert Penman, mine superintendent, is the practice of rebuilding cutting-machine bits with hard metal. The Borod tip now is placed along the front rather than on the face of the bit. This seemingly minor change has cut bit cost about in half and saves valuable time at the face by reducing the frequency of bit changes.

Narrow work (rooms, entries and breakthroughs) is 13 ft wide, but open-end lifts from the pillars

are 22 ft wide. Six holes, three top and three bottom, are drilled in the narrow places, and eight holes, four and four, in wide work. The holes are charged with duPont permissible, and the bottom bench is shot first.

At present, the single shuttle car provides economical haulage because the travel and discharge time of the car is used at the face for timbering and trimming roof. About 6 in of top coal is left.

In narrow places, three-piece timber sets (round collars) support the roof, while in wide places similar sets are placed along the



COARSE-COAL WASH BOXES and fine-coal air tables are major units in Renton cleaning plant, which produces 3,500 tpd in two shifts.



LOW-QUALITY CUTTINGS, loaded and hoisted separately, are carried to storage bin on upper belt and brought back for cleaning on main feed belt (lower left) when a sufficient quantity has been stored to warrant a change in cleaning-unit characteristics.

solid coal in the pillar and the open end is supported on a row of double posts under 30-in-long cap pieces. Intersections are reinforced by a square of 18-ft-long 8-in steel beams or 15-ft-long 9-in round timbers.

In 81-Butt section, production for the month of March was 134 tons per unit-shift.

3 Block System Facilitates Control

Good control of the gob line as workings retreat at Renton is a reflection of the block-retreat sys-

tem of mining, which schedules the removal of each cut according to its spot in the robbing plan.

Five-heading butt entries, 3,200 ft long, are driven from the mains on 640-ft centers, thus defining panel area. The accompanying diagrams show a typical section off Left North Mains, where the butt entry is driven to the property line.

The inby half of the panel is developed by the advancing headings, but room development in the outby half and robbing of all pillars except those between the two inby butt headings are done re-

treating. The single heading is maintained as an air return for the next panel, and the chain pillar is robbed from the next panel.

A 50-ft-thick barrier pillar is left in place along the property line, and a 200-ft-thick pillar along the mains.

Haulage track is laid in the butt entry to take full advantage of the benefits of looping the haulage circuit. Trips of empties are pulled toward the face in No. 80 Butt (Fig. 1) and around the loop in the breakthrough aligned with Room No. 17. Then the trip is pushed to the Porta-Feeder at the neck of Room No. 20. The Porta-Feeder pushes loads through the breakthrough aligned with Room No. 21, where the locomotive gathers them for the haul to the shaft. Thus, switching is held to a minimum and the cars are always properly oriented.

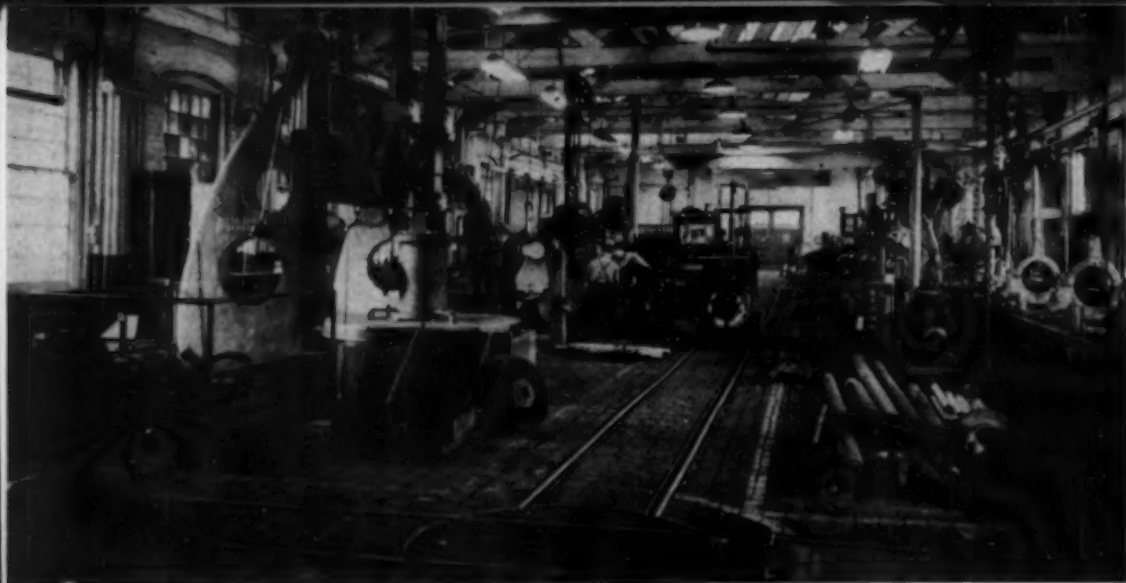
All curves in the 90-deg turn-outs are 30-ft radius. This standardization permits the use of prefabricated Bethlehem switches, which can be laid in about 2 hr by two men, Mr. Penman estimates. Marked savings in tracklaying labor are a result.

At the foot of the shaft, a Nolan rotary dump unloads the cars into a bin for skip hoisting.

Another cost cutter is evident in main-haulage roof support. Bearing plates cut from 5-in steel channels slide onto pieces of rail set upside down in the ribs. The channel sections are pierced through the flanges to accommodate the rail flange and part of the rail web.

The coal is prepared in a combination wet and dry plant. The Link-Belt washery, equipped with Baum-type jigs, cleans 4x $\frac{3}{4}$ -in coal and the Heyl & Patterson dry plant cleans minus $\frac{3}{8}$ on air tables. Prior to dry cleaning, the minus $\frac{3}{8}$ fines are split into three fractions, $\frac{3}{8}$ x $\frac{1}{4}$, $\frac{1}{4}$ x $\frac{1}{2}$ and $\frac{1}{2}$ x0, with each fraction fed to a separate table. After cleaning, the table products are blended into the company's slack. Middlings from the tables are cleaned in the jigs.

The official family at Renton No. 3 is headed by T. G. Ferguson, division superintendent. Mine supervision is the responsibility of Robert Penman, mine superintendent, and William Watson, mine foreman. Herbert Gall, master mechanic, and Harry Mulholland, chief electrician, are in charge of maintenance and allied construction. C. M. Hays is division engineer.



MINING-MACHINE REPAIR SHOP makes use of modern tools to keep numerous production units in top operating condition. Transportation and hoisting facilities increase materials-handling efficiency.

For High Efficiency Hudson Coal Backs Modern Mining With . . .

Controlled Maintenance

Numerous Machines and Widespread Operations Demand Accurate Maintenance Control

Versatile Central Shop Provides Fast Economical Maintenance Service

By HAROLD DAVIS, Assistant Editor, Coal Age

CONTROL is the keyword at the Providence repair shops of The Hudson Coal Co., Scranton, Pa., where mechanical and electrical equipment is repaired or rebuilt for the company's 10 collieries and five preparation plants in the northern anthracite field. Supplementing smaller colliery shops, which are equipped to make minor repairs and replace equipment units, Providence serves as a typical service facility, with company-operated collieries and cleaning plants in the role of customers.

A company maintenance policy that demands strict control of (1) equipment accountability, (2) quality of shop service and (3) maintenance costs makes Providence shop a necessary adjunct to

company success, rather than a necessary evil associated with machine mining.

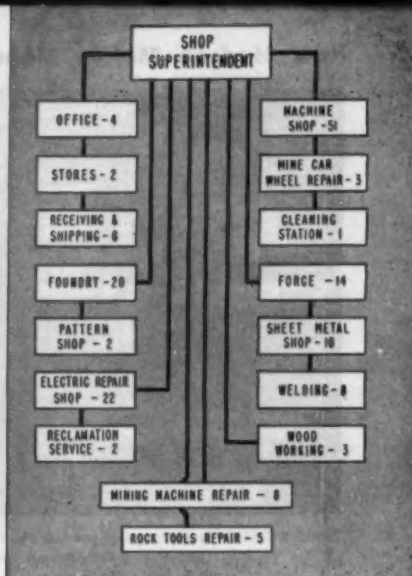
Maintenance responsibility was lifted 27 yr ago from production supervisors and vested in technical officials of the company staff. This action was based on convictions that (1) successful machine mining depends on excellent

SHOP WORK TAG			
COLLIERY		DATE	COLLIERY NO.
S.S. NO.	SHOP TAG NO.	COLLIERY ACCOUNT CHARGEABLE	
GRADE	UNIT OF MEAS.	COMPLETE DESCRIPTION	
EQUIPMENT FOR		S.S. CO. NO.	REV. NO.
CLASS AND AGE, NO.	GRADE	PRICE	
REPORT AND			
FOR NEW WORK: Colliery Rep's No.		REV. NO.	
SHIPPED TO		DATE	
REPAIRS APPROVED BY			

IDENTIFICATION TAG, tied to machines in transit, is protected from the weather by a transparent cellulose envelope to preserve data.



ELECTRIC-SHOP TECHNICIANS completely rebuild dynamo machinery and also reclaim serviceable elements from worn-out assemblies.



PLANNED ORGANIZATION promotes job for specialization and insures quality work.

THE HUDSON COAL COMPANY RECORD OF MAJOR REPAIRS										Form 717			
SHAKER CONVEYOR _____				MODEL _____				TYPE: UNDER SIDE					
Manufacturer _____													
DATE		New		Rep		New		Rep		New		Rep	
Arm, Rocking													
Bearing, Ball													
" "													
" "													
" "													
" "													
" " Liner Right Crank Shaft													
" " Left													
" " Pinion Shaft													
Cover, C I Double Spur Wheel													
" Rocking Shaft													
" Middle													
" Gear Case													
" Gear Wheel Case													
Frame or Plate, Bed													
Gear, Face													
" Wheel													
" "													
Lever, Connecting													
" " Complete													
" Rocking													
Pinion													
" Motor													
Plate, Motor Foot													
Rod, Connecting													
Shaft, Rocking													
" Crank													
" Pinion													
" Counter													
" Reduction Gear													
Steps, Brass													
Tooth Rims, 56T													
" 62T													
Wheel, Double Spur													

THE HUDSON COAL COMPANY SP-290

REPORT OF RECEIPT, SHIPMENT OR RELOCATION OF EQUIPMENT

Colliery _____ Date _____ 19__

(Received from _____)

(Shipped to _____)

We have (Relocated at _____ Colliery, the following-

(Motor _____)	(Locomotive _____)	(Pump _____)	(Compressor _____)
(Transformer _____)	(Engine _____)	(Hoist _____)	(_____)

Mfr. _____ Mfr. No. _____ HCC No. _____

Size _____ Full Nameplate Data _____

Date Rec'd. or Shipped _____ 19__ Transfer No. _____ Reqn. No. _____

Apparatus to be used on _____ Mfr. _____ Mfr. No. _____ HCC No. _____

Proposed New Location _____

Date expected to be put in service _____

Condition of Equipment Received or Shipped _____

REMARKS: _____

Maintenance Foreman

STREAMLINED ACCOUNTING of company-owned units, parts and supplies is made possible by forms such as these. Repair history, machine location and parts requirements for any unit can be quickly ascertained from files in the central shop office.

How Hudson Makes Maintenance a Controlled, Streamlined Operation



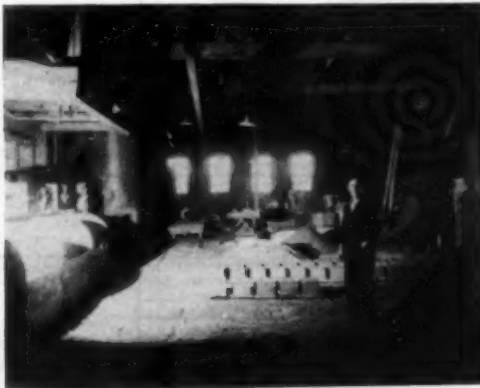
ERECTING SHOP provides space and facilities for reassembling overhauled equipment. Planer (left), with 6x22-ft bed, handles big jobs. Rebuilt units on the shop floor are tagged for reshipment to collieries.



A PLACE FOR EVERYTHING, and everything in its place, is the guiding rule in the toolroom as well as throughout the shop. James Elsby, machine shop foreman, keeps close check on machine-tool parts and supplies as a definite part of good housekeeping.



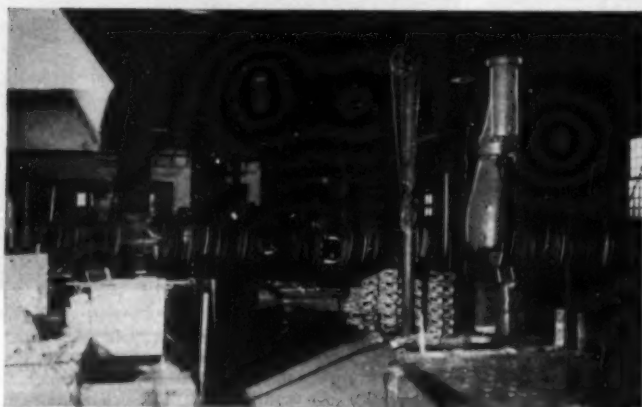
SINGLE-PHASE 250-KVA SPOT WELDER attaches bolt lugs, gusset plates and tee bars to conveyor pans held in pivoted jig.



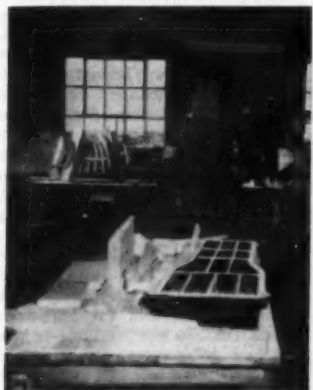
IRON AND BRASS FOUNDRY, supervised by J. Stewart, converts colliery scrap to useful parts with two anthracite-fueled cupolas.



SKILLED MACHINISTS, manning this battery of up-to-date machine tools, fabricate repair parts for a wide variety of mining applications.



AIR HAMMER (right), in forge and blacksmith shop, has interchangeable dies for straightening pens and forming conveyor parts.



INTRICATE CASTINGS are shaped from patterns like those on shop benches.

machine maintenance, and (2) formulation and administration of a maintenance policy are legitimate functions of top management personnel.

The need for top-management scrutiny of machine maintenance is apparent in a partial list of company-owned equipment: 402 shaker-conveyor drives with accessories, 230 scraper loaders, 240 car-spotting hoists, 17 steam-powered shaft hoists, 252 electric mine locomotives, 41 steam locomotives, 41 generators, and 2,322 electric motors of all types.

Equipment Accountability Prevents Confusion

The large number of units to be maintained and the 40-mi spread

of Hudson's operations make it necessary to keep up-to-the-minute checks on the location of each machine. Otherwise the mechanical-mining program would bog down in a tangle of mislocated machines and neglected maintenance, with the company's communications system suffering in proportion.

To streamline equipment accounting, the company adopted several forms which require minimum labor and provide maximum information for effective control. Typical of these are:

1. Form 603, Shop Work Tag.
2. Form 717, Shaker Conveyor Record of Major Repairs. (Other types of equipment have similar forms with other numbers.)
3. Record of Movement. (Reverse side of Form 717 or other appropriate form.)
4. Form SP-290, Report of Receipt, Shipment of Relocation of Equipment.

Form 603 is prepared in triplicate by the colliery maintenance foreman who sends the machine to Providence for service. The original is filed at the colliery office to complete the equipment inventory of the colliery, and the duplicate is a shipping memo from the colliery to the office of D. N. Smith, shop superintendent. In the shop this memo is held by the shop-division foreman to whom the job is assigned, and he returns it to the shop office when the job is completed.

The triplicate, on stiff paper and enclosed in a transparent plastic envelope, is tied to the machine as an identification tag. The plastic envelope protects the tag and its written information from the weather. The reverse side of the triplicate is ruled to provide an account of repair progress while the machine is in the shop.

Thus, Form 603 resolves some questions of accountability by providing the colliery with a written record (original) to explain the absence of the machine, providing the shop with a tracer (duplicate) for determining the location of the machine in any of the shop divisions and providing permanent identification (triplicate) on the machine to be repaired.

Form 717, Record of Major Repairs, is prepared in the shop office the first time a machine enters the shop for repair. It becomes a permanent journal of the repairs done on the machine and the parts consumed by it. Each major part of the machine is listed on the

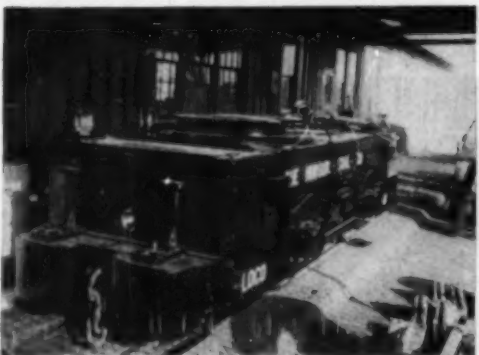
Hudson Maintenance Requires Good Records and Firm Cost Control



INCOMING EQUIPMENT is steam-cleaned at the cleaning station before entering the shop for disassembly and repair.



READY-TO-BE-REPAIRED EQUIPMENT stands in the shop yard near boom derrick which unloads trucks and railroad cars.



REBUILT LOCOMOTIVE leaves shop for another tour of duty. Each part has been inspected and repaired or replaced.



DINING HALL for shop employees features cleanliness, good coffee and radio programs for lunch period relaxation.

form and a check in the appropriate column indicates whether a part was repaired or replaced in any of six visits to the shop.

On the reverse side of Form 717 is a record of movement showing the date the shop received the unit and its accessories and the colliery from which the machine was received. As is sometimes necessary, the machine may be shipped to a different colliery after repair, and columns are provided for this information.

It is a matter of strict policy that machines sent to Providence be accompanied by all accessories. In the case of a shaker-conveyor drive the accessories would include drive pan, drive arms, jacks, control panel, and so on. This practice insures that performance of a repaired machine will not be limited by substandard accessories, because they are repaired or rebuilt while the main unit is serviced.

Form SP-290, Report of Receipt,

Shipment or Relocation of Equipment, is prepared in quadruplicate by the maintenance foreman at a colliery that is party to any of the transactions described in the title of the form. Copies are directed to E. C. Weichel, vice president; L. H. James, electrical engineer; E. M. Snyder, mechanical engineer, and D. N. Smith, shop superintendent. All interested officials are thereby informed of the new location of the machine, whereupon the shipping colliery is relieved of accountability and the receiving colliery assumes accountability.

Quality Control Insures Good Machine Performance

Control of the quality of work performed at Providence is exercised through careful selection of raw materials to be used in machine repair, close inspection of finished work and constant evaluation of shop processes against

the service demands to which the equipment will be exposed.

Metal stock is color-coded according to the recommendations of the American Iron & Steel Institute. The end of each bar is painted a color that identifies the properties of the steel, thus permitting quick selection of the type required to turn out a part that will satisfy specifications. Storage of metal stock is simplified because additions to inventory need only be added to stockpiles of corresponding color, and procurement of new supplies is easier because shortages quickly become apparent.

At the other end of the line, close inspection of finished work results in only high-quality workmanship on parts for machines. Parts that do not conform to prescribed tolerances are rejected, and excessive rejections indicate to shop supervisors that a process may need study and improvement.

Effective shop organization,



D. N. SMITH, shop superintendent, supervises a major company facility at Providence.

The Hudson Coal Co. Chain-of-Command for Controlled Maintenance

G. B. Fillmore, President
E. C. Weichel, Vice President
J. M. Reid, General Manager
J. S. Johnson, Superintendent of
Construction & Maintenance
L. H. James, Electrical Engineer
E. M. Snyder, Mechanical Engineer
D. N. Smith, Superintendent of
Providence Repair Shops

which promotes a high degree of job specialization, also raises the quality of workmanship by insuring that each post is manned by a highly-skilled technician.

Overall shop management is exercised by D. N. Smith, superintendent, whose qualifications include a long record of maintenance management in both anthracite and bituminous areas. Prior to World War II, Mr. Smith was a colliery maintenance foreman and then assistant superintendent of maintenance for The Hudson Coal Co., moving into bituminous maintenance-management for a number of years during and after the war. In 1948, Mr. Smith returned to Scranton and his present position from a similar post at National Mine Service Co., Beckley, W. Va.

Shop divisions and the foreman in charge of each are: mining machine repair shop, Garfield Jones; electric shop, John James; machine shop, James Elsby; foundry and pattern shop, John Stewart; forge and sheet-metal shop, Daniel Hartzell; mine car shop, John Travis; rock-force tool shop, William Graff; and chief clerk, David Pierce, in charge of the office staff.

How Maintenance Costs Are Controlled

Cost-control governs at Providence shop to the same extent as at the collieries. The most important actual cost-cutting function of the shop is fabricating certain machine accessories that can be made with existing shop facilities.

Considering the number of machines owned by the company and serviced at Providence, it is conceivable that the repair load might

fluctuate, with periods of low demand for repair service accompanied by enforced idleness for technicians and their tools. This effect is cushioned by the fabricating projects, which are designed to provide a stock of materials-in-process at each division. However, fabrication of accessories is not adopted for the sole purpose of utilizing the full capacity of the shop.

A prospective process is subjected to a rigid time study and cost analysis to firmly establish the fact that the process will not become a penalty on the cost sheet. Therefore, two conditions must be satisfied before a new process is accepted. The project must dovetail with shop organization and equipment, and it must be a venture that cannot be more economically performed by others.

Among the accessories produced at the shop are: bolt lugs, gusset plates and tee bars for shaker-conveyor troughs; ball frames, rocker-type supports and bolts for trough lines; scoops and pulley cages for scraper loaders; pump parts and cast-iron pipe fittings for drainage lines; journal brasses for rolling stock, and so on.

The welding shop and mine-car wheel repair shop assemble shaker-conveyor pans and ball frames from parts shaped in the forge and foundry. The machine shop produces studs and bolts, finishes brass bearings and turns out components for the rocker-type conveyor supports. The electric shop, least adaptable to fabricating activities, carries on a reclamation many control panels and electric many control panels and electric units by cannibalizing serviceable elements from worn-out assemblies. Thus each shop

division has an auxiliary function.

In dealing with the collieries, the shop receives no advantage by virtue of the fact that it is a company organ. This is best illustrated by company policy concerning the disposition of colliery scrap. A monthly survey made by the maintenance staff determines the quantity and types of scrap metal at the various properties. Any such material that can be used in Providence foundry is "purchased" from the colliery at the prevailing open-market price for scrap of the same quality. The purchase price then becomes a raw-materials expense of the shop and a credit toward colliery maintenance costs.

A true picture of the cost of operating the shop is obtained and the collieries receive credit for the salvage value of equipment worn out in service.

Scrap policy offers another illustration of controlling costs. Usable scrap is returned to the shop and melted down in two anthracite-fueled cupolas. Each cupola charge is analyzed in the company laboratory and a copy of the analysis is filed by Mr. Smith against the time when castings of specified composition may be needed. To obtain such castings it merely is necessary to calculate the amounts of alloying metals required. This procedure results in castings that fully satisfy specifications without wasting alloying metals.

Repetitive jobs, such as armature winding, consume a minimum of time because vital information that will give the technician a head start on the job is filed in the shop office.

Materials-handling efficiency is increased by hoisting equipment and transportation facilities at all shop divisions. A network of truck roads, narrow-gage track to all shop units and two standard-gage spurs into the shop area eliminate the necessity for manhandling heavy equipment. Monorail systems, with electric and chain hoists, serve all interior working areas, boom derricks handle truck and railroad car loads, and a portable crane moves loads that are out of range of fixed facilities.

With regard to working environment, the company recently modernized the shop by installing such improvements as color dynamics, fluorescent lighting and a neat dining hall where employees gather for lunch. Coffee is provided by the company and a radio is installed for the use of the men during the lunch period.



THE LARGEST VERTICAL TURBINE coal-mine dewatering station in the world, the 279-ft Dry Hill shaft has four 5,000-gpm units. Flappers held open by water flow (right) are attached to mercury switches that stop pumps if flow decreases.

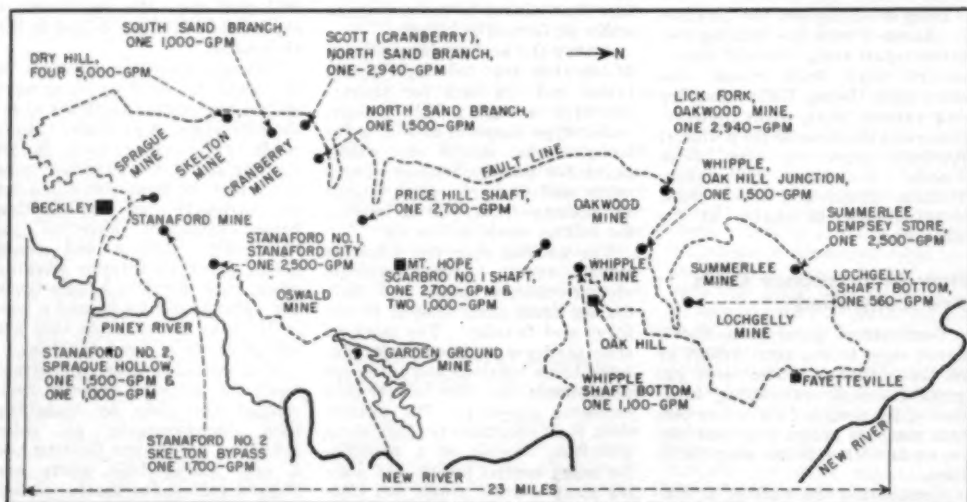
Long-Range Program of Turbine-Pump Installation Over 25-Mi Mining Area

Slashes Mine-Drainage Costs

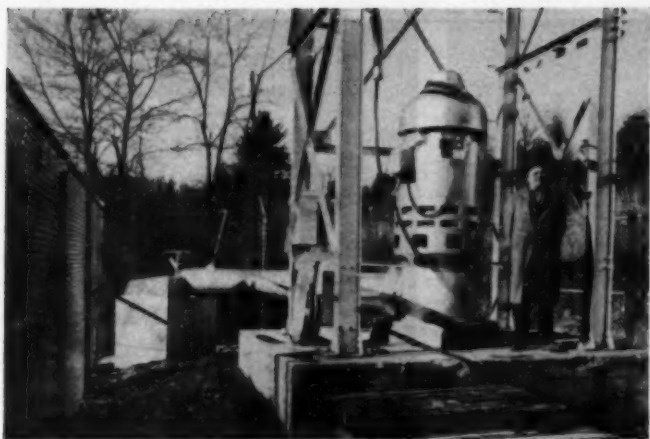
The New River Co. in 1951 Will Complete a 10-Yr Drainage Project With Installation of 22 Vertical-Turbine Pumps—Tangible Operating Results Include:

Sharply Reduced Labor, Power and Maintenance Costs

Protection Against Sudden Mine Flooding and Provision for Future Development



NEW RIVER OPERATIONS cover an area some 25 mi. long, with approximate boundaries, outcrops and fault lines as shown by dotted lines. Seven of the vertical-turbine pump stations are located along the fault line to which the water drains.



AT THE LICK FORK STATION, Oakwood mine, C. C. Ballard, master mechanic, indicates the size of the 2,940-gpm pump equipped with a 300-hp motor installed in 1945.

A 90% SLASH IN PUMPING LABOR, a 25% reduction in power cost per thousand gallons pumped, and elimination of mine flooding from sudden influxes of water are among the very tangible accomplishments of a 10-yr mine-drainage project being completed this year by The New River Co. The company has 10 operations mining connected tracts with an overall length of some 25 mi in Fayette and Raleigh Counties, W. Va.

As a result of the program, most of the underground pumping sta-

tions which used horizontal centrifugal and reciprocating pumps have been replaced with vertical-turbine pumps installed at boreholes and shafts. Twenty of the turbine pumps are now in use. Four, installed at the top of a 280-ft shaft, handle 20,000 gpm and have a motor load of 1,800 hp.

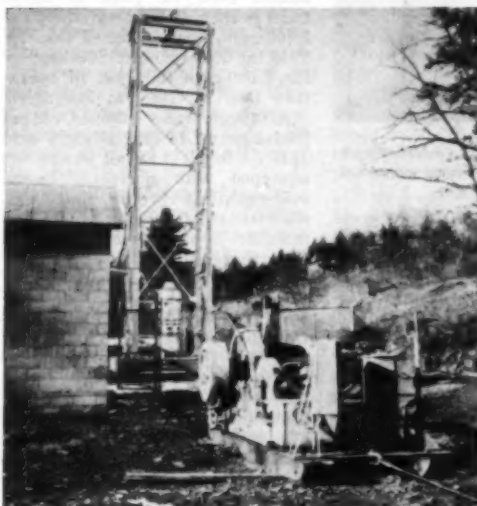
The New River Co., under the direction of E. Ebersole Gaines, president; A. J. Hunt, executive vice president; and C. R. Bourland, vice president in charge of opera-

tions, works nine mines in the Sewell seam and one in the Beckley. Operating offices are at Mt. Hope.

The coal measures undulate, with frequent local grades up to 25%, but generally dip 3% northwest toward a fault line approximately 20 mi long. The coal outcrops at one side of the field and lies as deep as 900 ft at the northwest boundary. Water has always been a difficult problem in the company's mines. The present pumping ratio is 11 tons of water per ton of coal shipped.

In July, 1933, The New River Co. pioneered in mine drainage by purchasing one of the very early vertical-turbine pumps for coal-mine drainage. The 1,000-gpm short-coupled unit, equipped with a Westinghouse 150-hp 1,770-rpm motor, still is working in its original location at the bottom of Scarbro No. 1 shaft. Advantages demonstrated by the first turbine pump led to the purchase in 1936 of another unit of the same capacity, in this case a long-coupled pump with the motor placed on the surface 389 ft above the bowls. A few years' operation of the second pump, made by Sterling and driven by a 150-hp 1,175-rpm General Electric motor, proved the practicability and further advantages of deepwell-turbine pumps for mine drainage.

High pumping costs, particu-



SKID-MOUNTED HOIST used for installing new pumps is kept ready for moving to any station where repairs are necessary.

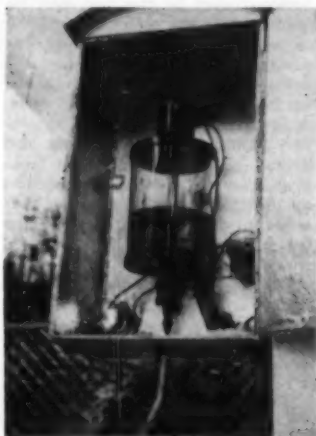


STEEL HEADFRAME, fencing and building of block walls and aluminum roof, now are standard for single pump installations.

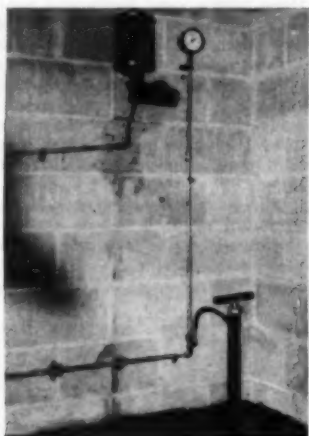
How New River's Turbine Pumps Cut Labor, Power and Upkeep Costs



RELIABLE CONTROL AND PROTECTIVE DEVICES, one of the company's policies in the entire drainage project, are typified by this incoming panel and four compensators at the 1,000-hp Dry Hill station (left). An electric clock on the compensator panel (right photo) registers the operating time of the Scott station, from manual starting until its automatic shut-down.



MAGNETIC OILERS on all pumps turn oil on and off as pumps operate.



SUMP LEVEL 494 ft below is indicated by gage registering tire-pump pressure.

larly the labor and power costs of old underground stations using horizontal centrifugal and reciprocating pumps, lack of capacity to cope with sudden influxes of water, and the necessity of providing for future development led the company to make long-range plans for cutting mine-drainage cost to a minimum, and at the same time preparing for wet seasons.

As a part of the program, it decided to replace most of the underground reciprocating and horizontal pump stations with vertical-turbine pumps installed at tops of boreholes and shafts to tap the basins where large sumps could

be effective. In 1940, orders were placed for one 2,700-gpm and three 2,500-gpm vertical-turbine pumps, which were installed in 1941 to place four of the company's mines on turbine-type dewatering equipment.

Total annual labor cost for pump operation at the four mines was slashed from an average of \$13,509 to \$1,700, while average power consumption dropped from 2.13 kwhr per 1,000 gal to 1.20.

These results, showing up in 1942 and 1943, lent further impetus to the program. Now 20 vertical turbine pumps are working to dewater the New River Co.'s

mines and the remaining two units will be installed in 1951.

Maintenance experience with the pumps has been very favorable. Some of the earlier pumps had to be pulled to make changes, such as altering the design from water lubrication to oil lubrication, but none of the three 5,000-gpm units installed in February, 1941, at the Dry Hill station has been pulled to date. Similarly, major changes have not been necessary in the 1,000-gpm unit installed Nov. 15, 1943, at South Sand branch, Cranberry mine; the 2,700-gpm pump installed Dec. 10, 1944, at No. 1 shaft, Scarbro; or the 2,500-gpm unit put in operation Dec. 15, 1945, at Stanaford.

Although water pumped ranges from neutral to only slightly acid (pH 7.8 to pH 5.4), all pumps are equipped with porcelain bowls, acid-resisting bronze impellers, stainless-steel impeller shafts and metallic bowl-assembly packings operating on stainless steel. All are of the oil-lubricated type.

The Dry Hill pumping station, now consisting of four 5,000-gpm A. D. Cook 24-in 5-stage pumps, is said to be the largest coal-mine-dewatering vertical-turbine-pumping station in the world. The four units are mounted in a 10x12-ft shaft sunk 271.5 ft deep for that purpose. Motors are 450-hp General Electric units operating at 1,180 rpm. The station dewateres an 8,000-acre area comprising Skelton and Sprague mines,

New River Co. Vertical-Turbine Pumps In Mine Dewatering Service

Location	Number Units	Gpm Each	Make of Pump	Motor Hp	Motor Make	Pump Size, Inches	Number Stages	Total Wt Suspended, Lb	Total Wt Water In Column, Lb	Borehole Casing, Inside Diam., Inches	Depth of Setting, Ft-In
Dry Hill.....	4	5,000	C	450	GE	24	5	25,700	19,900	Shaft	279-6
Stanford City.....	1	2,500	C	300	GE	16	11	26,500	12,200	17½	289-11½
Stanford-Sprague Hollow.....	1	1,500	C	150	US	12	13	22,480	13,700	15¾	380-10
Stanford-Skelton Bypass.....	1	1,700	C	150	US	12	8	14,094	7,370	15¾	243
Scarbro—No. 1 Shaft.....	1	2,700	C	300	GE	16	11	37,285	20,400	Shaft	390-½
Scarbro—No. 1 Shaft.....	1	1,000	P	150	W	..	..	..	..	Shaft	Short
Scarbro—No. 1 Shaft.....	1	1,000	S	150	GE	..	..	..	11,800	Shaft	389
Summerlee.....	1	2,500	C	300	GE	16	11	29,880	14,700	17¾	344-2
Cranberry-Scott.....	1	2,940	C	300	GE	16	11	33,796	16,700	..	394-2
Cranberry—N. Sand.....	1	1,500	C	250	GE	12	13	34,346	13,800	15¾	470
Cranberry—S. Sand.....	1	1,000	C	150	W	12	10	27,075	13,900	15¾	451-10
Oakwood.....	1	2,940	C	300	GE	16	11	33,796	16,900	..	494-2
Whipple—Oak Hill.....	1	1,500	C	250	US	12	13	35,470	14,800	15¾	502
Whipple—Shaft Bot.....	1	1,100	C	150	W	12	10	..	..	Shaft	Short
Stanford—Sprague.....	1	1,000	D	..	..	14	5	..	..	..	..
Lochelly.....	1	560	C	125	US	12	15	..	..	Shaft	Short
Price Hill.....	1	2,700	D	125	US	16	2	..	..	Shaft	128-6
C.....A. D. Cook, Inc.	S.....Sterling	GE.....General Electric	W.....Westinghouse								
P.....Pomona	D.....Deming	US.....U. S. Electrical Mfg. Co.	Short.....Short-coupled shaft-bottom setting								

which are presently operating, and the Mabacott mine, which has been worked out. The Dry Hill station replaced 18 pumping units and is saving \$25,000 a year in power cost and pumping labor—based on the 1940 wage scale.

An attendant living within 150 ft of the station starts the pumps during the late afternoon or evening to operate them on off-peak power. After first determining the water depth in the sump, he starts one, two, three or four pumps as required. He gages the depth by the simple and infallible method of pumping a few strokes with a tire pump and noting the maximum pressure he can develop on a dial gage graduated in feet of water depth (COAL AGE, May, 1950, p. 102). The connection between the gage and water is a ¼-in pipe with its open end at the bottom of the sump.

A flapper on the end of the horizontal discharge pipe of each pump, to which a mercury switch is attached, serves to shut down the pump if water flow stops or decreases as a result of an empty sump or a mechanical or electrical difficulty. C. C. Ballard, master mechanic of The New River Co. and in general charge of electrical and mechanical equipment, has been zealous in applying reliable control and protection devices and in standardizing equipment so far as practicable for all stations. J. E. Howard, chief engineer, and H. G. Houtz, ventilation and drainage engineer, also have been particularly concerned with

How New River Program Slashed Pumping Costs At Four Mines

Dewatering costs and performance at four mines before and after 1941, when they were drained to a central sump and three 3,000-gpm 24-in vertical-turbine pumps installed.

	BEFORE Yearly Average, 1938-39-40	AFTER Yearly Average, 1942-3-4-5
Total labor cost.....	\$16,952.37	\$1,713.45
Power consumed, kw-hr.....	3,762,287	1,906,000
Water pumped, 1,000 gal.....	1,771,174	1,764,000
Water pumped per dollar of labor, 1,000 gal.....	106	1,118
Power consumed, kw-hr per 1,000 gal.....	2.13	1.20
Coal produced, tons.....	1,261,334	1,460,179
Water pumped per ton of coal, gal.....	1,404	1,077

development of this big project.

Of the 20 pumps, 17 were made by A. D. Cook, Inc., and include several duplicates. Three of the motors are Westinghouse, six are U. S. Electrical Mfg. Co. and 11 are General Electric.

In several of the units the weight of the water in the column discharge alone borders on 10 tons, which, together with the weight of the pump and motor and the steel headframe, calls for a sturdy foundation. To minimize any possibility of settlement that might throw the pump out of line, the concrete is carried to bed rock, or, if laid on soil, is made large enough to provide a bearing with a safety factor of at least two.

Steel headframe design for single pumps has been standardized. Dimensions nominally are 6x8 ft by 39 ft high. Columns are

8x5-in by 17-lb I-beams. The towers are shop-fabricated in two 19½-ft sections and are spliced at the center with fitted bolts in the field. One side of the headframe is free of bracing up to 31 ft to facilitate handling of pump sections. Each tower is fitted with a head sheave and with a roller at the bottom.

One semi-portable hoist serves all pump stations—a slow-motion Lidgerwood single-drum-type unit driven by a 50-hp AC motor and mounted on skids so that it can be pulled up onto a semi-trailer.

Electric controls are conventional manually-operated compensators. Incoming panels in all stations are equipped with watt-hour meters. The big station at Dry Hill also has an ammeter, voltmeter and demand meter with 7-day chart. The stations which

SHEET NO.

**STANDARD FORM
PRELIMINARY & FINAL INSTALLATION DATA
ALL DEEP WELL TURBINE PUMPS
THE NEW RIVER CO.**

ENG. DEPT. MT. HOPE, W. VA.

SHAFT END PLAY

MINE PLACE (OUTSIDE)

SURFACE

ELEVATION

BORE HOLE OR WELL

CASING ID

COLUMN SIZE

COLUMN TYPE

SHAFT TUBE

SHAFT SIZE

SHAFT SPEC.

TOTAL WEIGHT

SUSPENDED ELEMENT

PUMP SIZE

STAGES

CURVE

BOWLS

IMPELLER

ELEV.

STRAINER

ELEV.

ELEV.

TOP OF COAL

BOTTOM OF COAL

BOTTOM OF SUMP

LOCATION DATA

DATE

DATA COMPILED BY

DATE PURCHASED

DATE INSTALLED

PURCHASE ORDER

MINE LOCATION (INSIDE)

TURBINE PUMP DATA

MFG.

HEAD

CAPACITY

SERIAL

WATER ANALYSIS

HEAD NO.

OILING DEVICE

MOTOR DATA

MFG.

FRAME

VOLTS

SPEED

SERIAL

BEARING TOP

BEARING BOTTOM

HORSE POWER

WATER COOLED

IMPORTANT: Any changes to installation must be reported to the Engineering Department.

DRILLED BY

TYPICAL OF THE EXTENSIVE RECORDS kept on all pumping installations is the 14-day daily inspection sheet (bottom), and the standard form for preliminary and final installation data (top).

**THE NEW RIVER COMPANY
PUMP INSPECTION REPORT**

Pump Location Long Hill Mine

PUMP NO.	BORN		SAT.			FRL	
	2	3	8	9	10	14	15
DATE	July 1950						
Mine Oil Level - Top bearing	OK	OK	OK	OK	OK	OK	OK
Mine Oil Level - Bottom bearing	OK	OK	OK	OK	OK	OK	OK
Was oil added (or bearing?)	No	No	No	No	No	No	No
Was oil added (bottom bearing?)	No	No	No	No	No	No	No
Last date of change	5-5-49	5-5-49	5-5-49	5-5-49	5-5-49	5-5-49	5-5-49
Mine condition - everything normal	No	No	No	No	No	No	No
Explains before such as bearing, mine	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Vibration, oil leakage, etc.	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Mercury switch and flapper position	OK	OK	OK	OK	OK	OK	OK
Was valve closed?	OK	OK	OK	OK	OK	OK	OK
Older drops per minute	7	7	7	7	7	7	7
Condition of electrical equipment	OK	OK	OK	OK	OK	OK	OK
Time pump started	9:00 PM	9:00 PM	10 PM	11 PM	9:00 PM	9:00 PM	9:00 PM
Mine Reading	878.6	879.6	884.4	885.3	886.2	887.5	890.3
Mine pump ran last time	18	18	18	18	18	17	17
Feet of water	18	18	18	18	18	17	17
Last date of change in compressor	1-23-47	1-23-47	1-23-47	1-23-47	1-23-47	1-23-47	1-23-47
Last date of change in receiving switch	1-23-47	1-23-47	1-23-47	1-23-47	1-23-47	1-23-47	1-23-47
Condition of water lubrication system	OK	OK	OK	OK	OK	OK	OK
Remarks							
Time	9:00 AM 8:00 AM 8:00 AM		7:00 AM 7:00 AM 7:00 AM			6:00 AM 6:00 AM 6:00 AM	

Operator's Signature R. Williams Inspector's Signature

NOTE: Any unsafe conditions or any extra rise in water to be reported to Superintendent and Master Workmen at once.

are automatically shut off by low water in the sump operating a flapper mercury switch are equipped with kitchen-type electric clocks that record the operating period. All pumps are fitted with magnetic oilers, which assure lubrication upon starting the pump and prevent waste of oil after the pump is stopped.

Ten of the pumps are positioned at boreholes drilled especially for that service. Pump sizes are as follows: one 14-in, five 12-in and four 16-in. Churn drilling of the boreholes has been performed by drilling contractors, including E. P. Pauley & Son and McCormick. The most recent holes were drilled by Mott Core Drilling Co. While a 20-in hole, if straight, is sufficient for a 16-in pump, the most recent holes drilled for that size pump have been 22 in. The extra 2 in was the contractor's choice and was welcomed by the company.

One of the two pumps to be installed this year, which will complete the drainage program, is a 2,500-gpm Cook unit, to be placed at a second borehole at Dempsay Store, Summerlee mine. The second is a 2,940-gpm Cook pump to be installed at a second borehole at the Lick Fork station, Oakwood mine. Both pumps are duplicates of ones already at those respective stations.

Separate standard forms, which are filled out to provide all pertinent information on each pump, together with the many other sheets of data and drawings pertaining to the installations, analysis of waters, and so on, are maintained in a loose-leaf book in the Mt. Hope office.

Operators or inspectors of the pump stations prepare daily logs on a form with spaces for 14 days' operation. These data cover the points requiring inspection or observation, as well as the period of operation, power-meter readings, etc. At the end of the year a pump record is prepared that summarizes all operating data and presents company officials with a complete picture of dewatering for all New River mines.

In 1950, when the company produced 2,674,262 tons of coal from mines that require pumping, 7,071,449 gal of water (equal to 29,465,044 tons) was pumped. Rain during the year totaled 56½ in and the snowfall 56¼ in. Total power consumed in pumping was 12,294,611 kwhr, which was 25% of the total power purchased by the company.

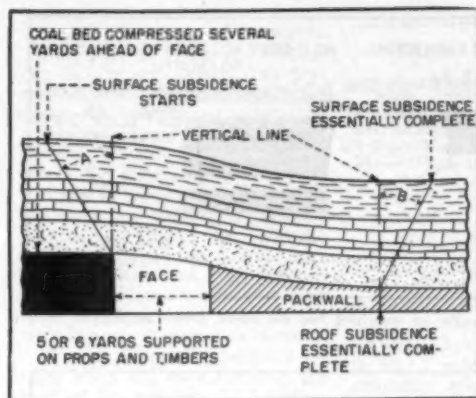


FIG. 1—HOW ROOF acts in longwall mining with backfilling.

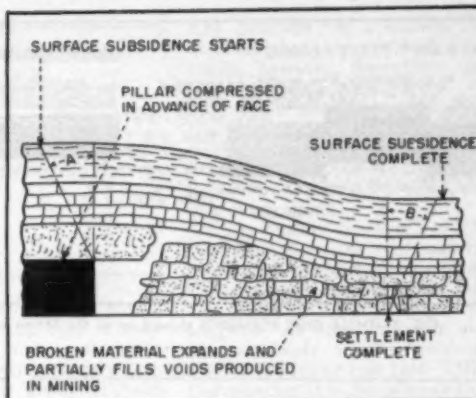


FIG. 2—HOW FULL MINING affects roof in room-and-pillar work.

What Happens and Why in . . .

Multiple-Seam Mining

How Various Factors Affect the Minability of Thinner Seams Overlying and Underlying the Main Seam—What You Can Expect in Multiple-Seam Mining and What You Can Do to Offset Unfavorable Conditions

By CHARLES T. HOLLAND, Head
Department of Mining Engineering
Virginia Polytechnic Institute, Blacksburg, Va.

FOR ECONOMIC and other reasons, it appears that the long-standing practice of mining the seams providing the lowest cost or best suited coal to the demands of the market will continue for some time to come, without particular regard for the order in which the seams may occur. However, partial exhaustion of the premium beds and greater emphasis on conservation has focused growing attention on the considerations involved in extracting other and, in many instances, thinner seams above and below the main seam, or in planned development of all the seams that may be present in a property.

What happens to an upper or lower bed when the main bed is mined? If the unmined bed is damaged, how is it done? What factors determine the extent of the injury? What steps may be taken to keep the damage to a minimum?

And, where damage is done, is it possible to mine the bed or beds, and if so, at what increase in cost?

What the Factors Are

Factors involved in the problem that are immediately recognizable as of paramount importance include the following:

1. Mining methods used in extracting the overlying or underlying bed, as well as the bed suffering damage.
2. Percentage and uniformity of recovery in all the beds concerned.
3. Intervals between the beds under consideration.
4. Thickness of the beds.
5. Nature of the strata between the beds.

Another factor would be dip. However, the discussion that follows is limited to flat-seam conditions.

It is immediately apparent that the effect upon an overlying or underlying bed is inextricably connected with the effect upon the overlying or underlying strata. Subsidence is responsible for most of the effects on the overlying bed. In contrast, the effect upon the underlying bed is a result of distortion of the forces acting on the bed, and on the strata lying between the two beds and damage to the strata above the mined beds.

If, therefore, the general principles determining the effects produced are to be investigated, it is necessary to inquire into subsidence, force distribution as influenced by mining, and actual damage to the overlying and underlying strata. Information is largely derived from observation and experience, since the factors entering into subsidence, force distortion and strata damage are, in general, too complicated for successful abstract consideration. Fortunately, considerable information is available from actual mining under the conditions being considered.

Subsidence—When a seam of coal, or any mineral, for that matter, is mined, stresses are induced in the surrounding rocks. As the area removed becomes larger, the stresses become greater until strata deformation or rupture permits the overlying beds to

How Mining One Seam of Coal Affects Seams Lying Above and Below



FIG. 3—THESE DISPLACEMENTS showed up in the Morris bed after an underlying bed was mined. (After Bunting.)

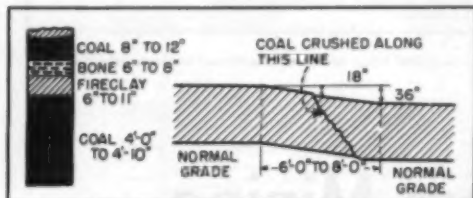


FIG. 4—THE REDSTONE SEAM broke this way when passing from solid coal to robbed area. (After Evenson.)



FIG. 5—SUBSIDENCE in the Low Main seam caused bonding, shearing and readjustment of level. (After Halbaum.)

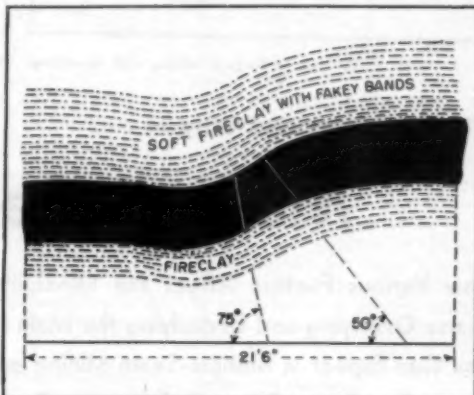


FIG. 6—THIS IS HOW banding showed up in Humph coal 800 to 900 ft beneath the surface. (After Briggs.)

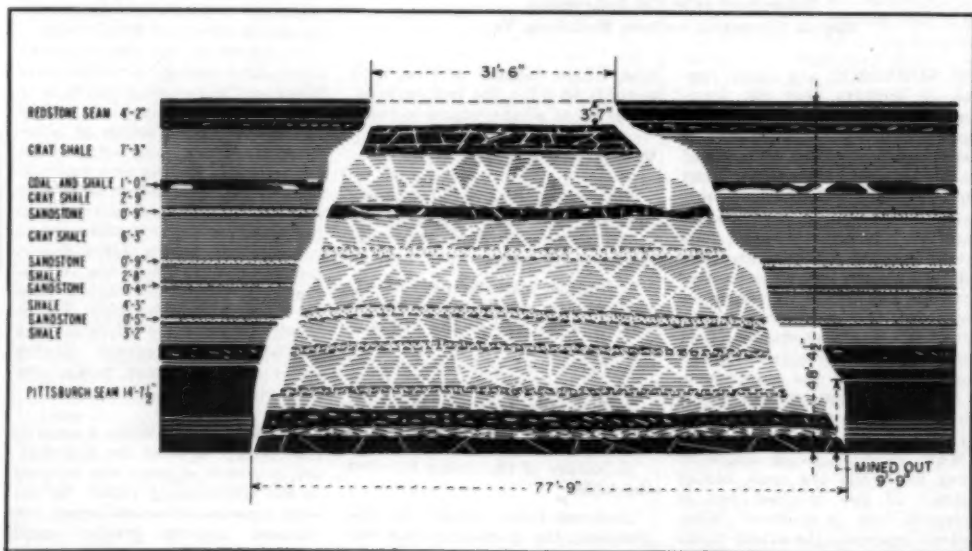


FIG. 7—PILLAR REMOVAL in the Big Vein seam, Georges Creek region, caused this action in the strata above.

subside in greater or less degree.

Two general types of overburden failure may occur. The first results when comparatively large areas are undermined, producing a general subsidence which progresses upward, permitting the strata to subside either collectively or individually until surface settlement is produced. In this process, all strata between the top of the mined bed and the surface are disturbed. In general, insofar as effects on overlying beds are concerned, this is the most important type of settlement.

The other type of subsidence results when the rock forming the roof of an opening—heading, crosscut, room, etc.—fails either because of overstress, weakness or both resulting from physical or chemical action. This type of subsidence usually is limited to a few feet of rock immediately above the bed being mined, although in some instances the beds have been observed to fall to a height varying from a few inches to 30 to 40 ft, with the falls extending hundreds of feet along one or more openings.

This type of subsidence usually will have little effect upon overlying coal beds unless they occur only a short distance above the mined bed, as, for example, do the rider coals over the Pittsburgh seam. If, however, the coals immediately above the bed being mined are of commercial thickness and purity, this type of subsidence could be very destructive.

The influence of mining methods—The first type of subsidence is influenced largely by the type of mining. The major types of mining today are longwall and room-and-pillar, with recovery being partial or complete. Each type has characteristics making it applicable under certain conditions. Also, each will have a somewhat different effect upon overlying coal beds.

Briefly, advancing longwall extracts the coal along a face varying up to 2,000 to 3,000 ft in length. Packwalls a few yards wide are built at intervals of a few yards to help support the overlying rock and yet permit slow subsidence until the resistance of the packwalls is sufficient to support the overlying burden. At the mined bed, subsidence starts a few yards in advance of the longwall face and is usually essentially complete 100 to 800 ft behind the face, depending upon packwall construction,

Table 1—Amplitude of Subsidence

Subsidence in Per Cent of Thickness of Bed Mined	Per Cent of Instances Observed
0-15.....	6.6
15-35.....	22.6
35-55.....	34.9
55-75.....	30.6
75-95.....	5.3

tion, thickness of the coal mined, depth of cover and rate of face advance. At the surface, as shown in Fig. 1, subsidence starts a considerably greater distance ahead of the face location and is not complete until a much greater distance behind the face is reached. The strata lying between these limits are in a state of motion and readjustment. The area of rocks in motion is determined by the angle of draw (Angle A, Fig. 1), the angle of drag (Angle B, Fig. 1) and the distance required for the roof of the mined bed to cease settling.

During subsidence, the rocks are bent through two arcs, with the curvature of one arc opposed to the other. Also, though the overlying rocks may be fractured, there is comparatively little displacement along the line of fracture. The action is illustrated in Fig. 1. At the face the radius of curvature increases as the vertical distance from the mined bed to a stratum increases and as a consequence the bending stress decreases as do the fractures resulting therefrom. Consequently the greater the distance is between the mined and the unmined bed, the less the tendency is for the unmined bed to be seriously damaged. Back from the face the roof rocks are bent in the opposite direction but here the support from the packwalls is becoming more effective and less damage is likely to occur.

If adequate packwalls are built, longwall retreating reacts essentially the same as advancing longwall.

In room and pillar mining, where complete extraction is attained with long pillar lines, there is a somewhat different effect. This results from the usual desire to relieve the pillars in the extraction area of as much weight as possible. Consequently, the plan is to break the overlying rocks and permit them to fall in the robbed area. This action is illustrated in Fig. 2.

Fracturing of the roof strata

may continue for a considerable distance above the coal bed. Eventually, however, depending upon coal thickness, nature of the strata and mining methods, the fracture and breakage become less until the subsidence approaches that resulting from advancing longwall, including a similar zone of moving strata.

Occasionally, however, in this type of mining, the roof material is of a nature difficult to break. Consequently, the roof may subside essentially as in advancing longwall. As with the latter, subsidence starts on the solid-coal side of the pillar line (see "Pillar Deformation in a Bituminous Coal Mine," C. T. Holland, Trans. AIME, Vol. 130, p. 340; also Bureau of Mines R. I. 3355), and is not complete for some distance back in the robbed area.

In room-and-pillar mining, leaving an unmined pillar in the robbed area is not unusual. When this happens, the strata usually shear at the edges of the pillar and subside. This action may extend for a considerable distance above the seam. Leaving such a pillar under these conditions is certain to result in considerable disturbance to the overlying strata.

The subsidence effects in retreating longwall where packwalls are not built are essentially the same as those resulting from room-and-pillar mining when complete extraction is practiced.

Where room-and-pillar mining is carried on and only partial extraction is achieved, the action again is somewhat different and, naturally, produces somewhat different effects in the overburden. Usually, mining is deliberately arranged so that the pillars left are insufficient to support the overlying material indefinitely. These pillars fall and lower the overburden more or less gradually. Consequently, under these conditions, except at the edge of the area, the overburden often is disturbed very little except where stronger pillars are left. These may act somewhat as similar pillars do in complete extraction. Also, where only partial extraction is achieved, the amplitude of subsidence may not be as great as in complete extraction.

From the foregoing it is evident that as far as overlying beds are concerned, the following effects are important:

1. Amplitude of subsidence, or how far a coal bed lying a certain distance above a mined bed will be lowered.

How Various Factors Affect Multi-Seam Mining and How to Offset Them

Table II—Angle of Draw*

Angle of Draw (Degrees)	Per Cent of Total Observations in Class	Angle of Draw (Degrees)	Per Cent of Total Observations in Class
-45 to -35	0.7	+15 to +25	18.7
-35 to -25	2.9	+25 to +35	10.9
-25 to -15	3.6	+35 to +45	5.0
-15 to -5	5.8	+45 to +55	2.2
-5 to +5	17.3	+55 to +65	0.7
+5 to +15	30.8	+65 to +85	1.4

* Positive angle of draw means that subsidence extended over the unmined coal. Negative angle of draw means that subsidence exists over the mined area only. That is, Angle A, Fig. 1, extends over the undermined area instead of the solid area.

2. The extent to which the rocks are fractured and how much displacement occurs along the line of fracture.

3. The area in active subsidence and the length of time required for the motion induced by subsidence to cease.

4. The extent to which the effects on the overlying rocks increase the difficulties of mining the overlying seams.

The amplitude of subsidence—Theoretically, as the distance above a mined bed increases, the amount of amplitude of subsidence should decrease. Information on this phase of subsidence, as obtained from observing surface subsidence, is, however, highly erratic. Some believe that the observations indicate that amplitude does decrease as the thickness of the overburden above the mined seam increases ("Mining Subsidence," Henry Briggs, p. 95).

Analysis of the data in some 75 investigations of surface subsidence indicates that the amplitude at the surface is highly erratic but that it will average about 53% of the thickness of the coal bed removed. Actual observations indicate that the surface may be lowered 38% of the coal-bed thickness when the overburden is 3,000 ft thick and 55% when it is 2,400 ft thick.

The variation in the amplitude of subsidence, expressed as a percentage of the thickness of the bed mined, is given in Table I. It will be noted that irrespective of the thickness of the overburden, the amplitude ranged between 15 and 75% of the bed thickness in about 88% of the instances observed.

Observations on amplitude of subsidence in overlying coal beds indicate a subsidence of 8 to 50% of the bed thickness mined. Frequently, however, this may not include total subsidence but instead

relative displacement. The data in Table I indicate that the overlying beds may subside a distance greater than their thickness where thick underlying and thin overlying beds are mined.

Fracture and relative displacement—Although important in mining, fracture of overlying coal beds and the rocks making up their immediate roof and floor is difficult to describe quantitatively. Figs. 3, 4, and 7 indicate the condition that may be expected. Also, study of some 38 instances of subsidence in overlying beds mined after the lower beds had been removed indicates that in about 75% of the instances mention is made of fractures in the overlying bed or its roof and floor.

These fractures, of course, permit other unusual conditions to develop. In some instances, the fractures extend to the surface or to overlying strata carrying large quantities of water, thus admitting water to the coal bed. In one or two instances, the cracks permitted surface water and air to enter, causing the shales forming the immediate roof of the coal bed to weather. In other instances, the cracks permitted water in the overlying bed to flow to the lower beds, thereby improving drainage and making it less costly.

Also of much importance is the relative displacement occurring between the various segments of a fractured stratum. A coal bed 3½ ft thick and broken into two or more segments with relative displacement of 4 ft or more would be completely cut out as far as mining operations are concerned. A similar condition is shown in Fig. 5. Mining has disclosed many displacements in coal beds having displacements of a few inches to a foot or two, such as those illustrated in Figs. 3, 4, 5, and 7.

In some instances, however, the

adjustments are not by shear and displacement but by bending of the beds. Fig. 6 is an illustration.

The area over which active subsidence is occurring and the time required for subsidence to cease—The area affected by active subsidence in an overlying bed is determined by the angle of draw, angle of drag, and the distance behind the face at which the roof of the mined bed has settled to stability. An analysis of 129 angles of draw in some 75 different investigations of subsidence yielded the information shown in Table II. The angle of drag has not been so extensively measured but it may be assumed as approximating the angle of draw.

By referring to Figs. 1 and 2 and Table II, it may be seen that in the case of an overlying bed placed a considerable distance above the mined bed the area of the overlying bed in moving strata will be considerable. Mining in this area in the overlying bed would present more problems than in the undisturbed area or in areas where settlement had essentially ceased. Subsidence and readjustment in the upper bed will be most active usually in the area lying a short distance behind (on the robbed side) of the pillar line in the lower bed. For this reason, when pulling pillars in an overlying and underlying bed at the same time, the pillar line in the overlying bed should be kept substantially ahead (on the solid coal side) of the pillar line in the subjacent bed.

Once subsidence starts, it is of interest to know how long it will continue. Accurate data can be obtained only by time-consuming and expensive research. Little information is available from observations in beds that have been undermined. Most comes from observations on the surface. This may indicate too long a settlement time, since factors not related to settlement of mine caves are involved.

The data, however, do give some indication of the action to be expected. Among the important factors involved in the time required for subsidence to cease are:

1. **Nature of the strata**—Shales probably settle more quickly than sandstone.

2. **Method of mining**—Settlement probably ceases over long-wall workings somewhat more quickly than over room-and-pillar.

3. **Depth of overburden**—Time required for settlement of deep

cover naturally is greater than for light cover.

Observations indicate that subsidence may cease in as little as 6 mo for cover up to 300 ft and, in some instances, may continue for 25 yr with cover no deeper than 900 ft. Actual mining experience indicates that settlement in some instances ceases sufficiently for successful mining in as little as 3 mo, although in general better results will be obtained if settlement after removal of the lower bed is allowed to proceed for several times this period before attempting mining operations in the overlying bed.

Effect on Mining

Overlying beds.—Many prophesies of dire results have been made concerning the damage resulting from our more or less haphazard method of choosing a coal bed to mine irrespective of the beds lying above it. Actual mining experience indicates, however, that results have not been nearly so disastrous as predicted.

The overlying beds have been broken to a greater or lesser extent and in some instances have settled several feet. But in 33 examples described in mining literature ("Effect on Unmined Seams of Coal by Mining Seams Above or Below," C. T. Holland, Proc. W. Va. Academy of Science, Vol. 19, 1947; W. Va. Univ. Bull., Ser. 49, No. 8-1), attempts to extract the overlying bed, whether pitching or flat, have been successful in all but 2 or 3 instances. In very many instances, a high percentage of extraction has been achieved in the overlying seam. In a few, the extraction has been as low as 50%.

In localities where gas is found in the coal beds and adjoining strata, mining subjacent beds may increase the possibility of gas in the overlying bed. Since the gas enters the bed being mined along the shear planes produced by subsidence, it may come from gas-bearing strata either above or below the bed being mined.

Usually, some increase in cost has been encountered in mining the overlying bed. In a few instances, however, it has been thought that mining the underlying bed actually improved conditions in the overlying bed. In two instances, beds only 4 or 5 ft above the underlying bed have been mined successfully. In another, a bed 25 ft above a mined seam could not be worked at the time

the attempt was made. The same was true in another instance of a bed 10 to 20 ft above.

In general, it seems that if a bed lies as much as 20 to 25 ft above a mined bed, it usually can be worked with some increase in difficulty and cost if the lower bed is no more than 8 or 9 ft thick. As the interval between the beds increases, damage to the overlying beds decreases and subsequent mining is easier. It usually has not been possible to work an overlying bed successfully while pillar extraction is being carried out immediately under the area.

Certain steps can be taken to minimize damage to an upper bed as a result of mining a lower, as follows:

1. Extraction in the lower bed should be complete, with no pillars or large remnants left intact in the robbed area.

2. Pillar lines should be kept long and straight to reduce shearing of the overlying strata at the edges of barrier pillars as well as to promote subsidence by bending rather than shear.

Of the various mining methods, longwall with packwalls or backfilling normally results in the least damage to overlying beds. The cost with this method, however, is such that a penalty in the form of an increase in the cost of mining the upper bed is to be preferred.

Underlying beds.—Research by many investigators has demonstrated that, close to longwall faces and pillar lines, the coal is subjected to rather severe stresses induced by mining. These stresses are transmitted to the underlying strata and by them to underlying coal beds. Also, when pillars are made, the load, formerly distributed more or less uniformly over the entire bed, is concentrated on the remaining pillars and transmitted through them to the underlying rocks.

In addition, if a pillar is left intact in a robbed area, the load transmitted to the floor of the seam is very great and will result in heavy stresses in the neighborhood of the pillar in the overlying beds. Consequently, after an overlying bed has been removed, it is entirely possible that high-stress areas will result from entire pillars or pillar remnants unavoidably left in place. These stresses, if sufficiently intense, may fracture the underlying strata and, if

the underlying coal bed is not separated from the mined bed by too great an interval, may produce fractures or incipient fractures in the underlying bed as well as in its roof and floor. Prior to mining it little or no displacement is likely to occur.

In addition to the effects produced by stresses attending mining, other factors affect the mining of the underlying bed either directly or indirectly. One is the fractures produced in the strata above the mined overlying bed, as well as the comparatively heavy load of broken material produced in certain types of mining.

This condition, coupled with deterioration of the strata over the unmined lower seam caused by the induced stresses previously described, will probably result in more roof and floor trouble than if the overlying seam had not been mined first. Troubles from this source will diminish rapidly as the interval between the two seams increases. Also, intervals composed of strong sandstones, limestones or shales will render the effects less troublesome.

Accumulation of water is another condition brought about by mining the upper seam first. It is of importance principally where the top seam has been mined to the dip and it was impossible to establish gravity drainways to the lowest parts of the mine. The accumulation of water may be enormous, especially if part of the upper bed has been only partially mined. Consequently, as the lower bed is mined and the coal is completely extracted, cracks are almost certain to result, permitting this water to enter the lower bed. If the interval between the two beds is small, miners may be in considerable danger from intrusions of water from the upper bed.

Actual mining experience has demonstrated, however, that a coal seam lying below one previously worked almost always can be mined. If the interval between the two beds is small, considerable roof and floor control troubles may be experienced in working the lower bed. As the interval increases, however, the effect of mining in the upper seam on roof and floor control in the lower becomes less important. Because of the stresses induced, both from shear and flexure, it usually is desirable to columnize the pillars in the two beds. This is especially important if the two beds are mined simultaneously.

Old Ben Coal Corporation
West Frankfort, Illinois
December 13, 1950

Dear Wives and Mothers:

It is said "the hand that rocks the cradle rules the world." The author unquestionably meant that mothers, in the training of their sons, are responsible for the progress and conduct of mankind.

Mothers, apparently, are more successful in impressing their daughters than their sons. In 1948 there were 682,721 male arrests in the U. S. and 76,967 female arrests; a ratio of 9 to 1. With respect to our laws, it is apparent that the behavior of womenfolk is nine times better than that of menfolk.



... were the fault of many of the hilarious accidents girls in

You mothers, too, rear your daughters to be twice as smart as your sons in the prevention of accidents. The same year 67,082 males lost their lives from accidents, while the female loss was 30,919; a ratio greater than 2 to 1. Evidently womenfolk are more than twice as safe as menfolk who are employed in industry for the records show that all folks are safer on-the-job than when they are off-the-job.

One may contemplate the great Christmas premature fatalities were the result of careless driving at crossroads and issue orders that safety ten imperative member of her household, and

Sincerely for Safety

J. E. Jones
Safety Engineer



Raleigh-Wyoming Mining Co.
Rockley, West Va., August 26, 1950

Dear Worker and Boss:

Mothers were the first safety engineers. They were the only safety engineers for many, many centuries. They saw the chief ones now. They have a safety right as back seat drivers and to be safety directors from the cradle-on.

A mother's chief occupation in industry. When we were small she applied safety constantly. Her admonitions were often in the negative such as "don't do that." We habitually absorbed safety thinking and safety practices and eventually helped to take care of and teach safety to the younger children. Unfortunately bigger hazards the first ten years after mother's care are the hand-out. Fatalities then are much greater than in any other decade of our lives.

One of mother's safety efforts was to have us remember safety when excited or outburst; to look both ways before darting into the street no matter how important.

We know the safe way but under impulsive safety thinking is frequently thought for a few seconds. Our thinking speed has not increased in proportion with our highway and industrial speeds. We frequently do not have the two seconds or so in which to judge as we often had in the home and buggy days.

Mothers, if present, would be survivors of the unnecessary risks taken by their sons in the mines and would advise them "don't do that." The setting of proper, proper example of care, and other safety requirements would be better done. There undoubtedly would be better homecoming and fewer accidents.

1950 for Safety

J. E. Jones
Safety Engineer

POSTCARDS MAILED to home addresses state a new safety message every month. Each message is aimed at a different group — wives and mothers, children, workers, bosses.

Here's How One Safety Director Uses Postcards to . . .

Sell Safety on a Family Basis

Monthly Mailings to Miners and Families . . .

Swing the Family to the Side of Safety

Pre-Train Future Miners

Help Supervisors Reduce Accidents

Make the Community Safety-Conscious

"THE KIDS COMPLY . . . so shall I."

That snapper at the bottom of a message dated Nov. 23, 1950, and addressed "Dear Adults" reflects the basic idea of a new postcard safety campaign being carried on by the Old Ben Coal Corporation, in Illinois, and the Raleigh Wyoming Mining Company, in West Virginia. That idea is that the influence of the folks at home—wives, mothers and children—is the most potent of all in getting husbands and sons to work safely on the job.

There is, for example, food for real thought for father or son in the following excerpt from the Nov. 23 message:

"The big reason for safety thankfulness at this time is that our grade-school children are gradually getting too smart for their hazards. Last year, 22.3 of them, age 5 to 14 yr, lost their lives through accidents per 100,000 of population. For all ages, the rate is 2 2/3 times greater—59.5 fatalities per 100,000. The kiddies are being taught and are successfully

developing a 20th Century safety consciousness. Are we adults still living in this 20th Century with a 19th Century safety consciousness? We certainly are not keeping up with progress . . . not readjusting ourselves to this mechanical age as successfully as our kids are doing.

"It says in the Scriptures that 'A little child shall lead them.' It may be well for each family to spend at least one evening per week for safety instruction from our kiddies."

The postcard campaign was originated by John E. Jones, Old Ben and Raleigh Wyoming safety engineer. It grew out of a search for something that would leave its mark in the minds of the companies' employees—in other words, for something better than the usual methods of trying to stimulate thinking about safety, which had largely lost what effectiveness they might have had, particularly with the men over 40. The message of Jan. 13, 1951, for example, addressed to both workers and bosses, had this to say:

"Another year has passed into history. 'We are older and wiser' is an adage unanimously accepted. That, however, apparently is not true with respect to recent accident experience in our mines, the average per fatality being 50.5 yr. The average period of mine experience per deceased was 29 yr. The average age of employees in our Illinois and West Virginia mines is 42.

"The vast majority, however, do get wiser, but Father Time slows us down in alertness faster than

J. E. JONES
OLD BEN COAL CO.
WEST FRANKFORT, ILL.

Return Postage Guaranteed

To each of our New Employees:

Following completion of your name and address plate for our addressograph machine, you will get our monthly postal safety card.

The importance of safety is now well enough appreciated in our nation where between 90,000 and 100,000 folks lose their lives annually due to accidents.

These cards sent to your home may be of value in arousing an improved safety consciousness in each member of your family. We certainly need an improved safety effort at home, on the highways, and in the mines.

NEW EMPLOYEES get a special message saying they'll get a safety reminder each month.

we think . . . Our diminishing alertness as we mature must be replaced by a better application of the safety we know."

One mailing a month has been the schedule of the postcard campaign since January, 1950, when a modest start was made with standard-size postcards addressed to supervisors. In April, 1950, the program was enlarged and the direction was changed to the present one of creating and expanding safety consciousness in the minds of the men. Plans are being made, however, to give the supervisors an opportunity to back up and take advantage of the new atmosphere created by the card program.

Present cards usually are 5½x8½ in size. Each one bears a message prepared by Mr. Jones and signed by him as a part of the job of personalizing the campaign to the maximum extent. Personalizing also includes the salutation, which varies with the nature of the message and the particular group it is aimed at—women, children, employees or bosses. Each mailing as far as possible goes directly to the workers' homes. In Illinois, this is accomplished by addressing from a stencil list. Mailing is done by means of a postal permit at the usual card rate.

Employees receiving cards, exclusive of the main office in Chicago, include approximately 1,300 in West Virginia and 3,500 in Illinois. In addition, a special list includes school principals, teachers and other interested persons in the counties and communities.

Special messages to new employees are provided for on the first cards sent to them. These messages, as shown in an accompanying illustration, are put on the address side, using the "Ditto" process. They welcome the new employees, stress the need for safety and tell them that they will receive the messages regularly from that time on.

The messages are safety lessons, with the basic goal as safety on the job, though emphasis is also placed on safety in the home, on the highway and elsewhere. In other words, following out the personalization theme, an attempt is made to have something not only for the men but for all members of their families in every message.

In line with the basic approach that family attitude and interest are the most potent safety influence, certain messages are addressed to the women and children. For example, the message of Dec. 15, 1950, addressed "Dear Wives and Mothers," pointed out their accomplishments and opportunities in promoting safety. The text included the following:

"Mothers, apparently, are more successful in impressing their daughters than their sons. In 1948, there were 682,721 male arrests in the United States and 76,997 female arrests—a ratio of 9 to 1. With respect to our laws, it is apparent that the behavior of womenfolk is nine times better than that of menfolk.

"You mothers, too, rear your daughters to be twice as smart as your sons in the prevention of accidents. The same year, 67,082 males lost their lives while the female loss was 30,919—a ratio greater than 2 to 1. Evidently, womenfolk are more than twice as safe as menfolk. The reason is not the greater number of menfolk who are employed in industry, for the records show that all folks are safer on the job than when off the job. . . .

"Mothers are our leading safety engineers. It would be a great Christmas present to the families of the U.S.A. if each mother would issue orders that safety would rule throughout 1951 in every activity of each member of her household, and that she would be and apply the ruler."

"Dear Kids" was the salutation on the message of April 14, 1951, in part as follows:

"The best advance in safety is being made by you kids. Your safety patrols, fire drills and obedience to regulations show a natural improvement in the public-school ages from 5 to 14 yr inclusive. You have doubled your safety record in the last 25 yr. . . .

"Our mine workers and bosses are to be gradually replaced by the schoolboys. These boys have the advantage of safety education in school their dads did not enjoy. They'll make safer workers and safer supervisors. It is interesting for them to learn now from dads and big brothers the hazards of industry and to frequently discuss these at home and at school. Vocational training is of great value in improved safety in industries. It is much smarter to learn safety from others than to learn it the hard way."

The postcard campaign was not designed to replace or substitute for any of the other measures being taken to promote safety at Old Ben and Raleigh Wyoming mines. Rather it was to go beyond them while at the same time giving them greater force and meaning. Both the reaction of employees and their families and the frequency figures show good results.

Personal reaction has included numerous comments from men and their wives, in addition to formal letters evidencing interest and asking for more information on the problem of mining safety, as well as safety in the home and elsewhere. In many instances, receipt of the monthly message, the management has been told, is the signal for a family safety meeting. The messages, or excerpts from them, also are used in classroom work in the schools and as topics for meetings of women's clubs and church groups.



HIGH OVERBURDEN—Dragline, $\frac{3}{4}$ -yd shovel and bulldozer are three-unit team removing 55 ft of B seam cover.



LOWER OVERBURDEN—High lift shovel uncovers coal, while loading shovel loads trucks for 8-mi haul to plant.

Deep and Strip Mining Plus In-Transit Cleaning Feature in . . .

Making High-Quality Fuel

Bulwarking the Operation With Coal From Its Own Mines, Elliot Coal Mining Co., Philipsburg, Pa., Sparks Local Coal Industry by Providing a Central Cleaning Plant for the Raw Coal of Smaller Companies



ELLIOT CLEANING PLANT has three-stack loading for industrial fuel and three 50-ton truck service bins for domestic coal.

FORGING TO THE FRONT as the leading producer in Pennsylvania's eighth bituminous inspection district with 419,338 tons in 1950, Elliot Coal Mining Co., Philipsburg, Pa., operates from this three-fold prospectus:

1. Moshannon and B seam coals in the Philipsburg-Clearfield County locale are recognized in the trade as excellent low-volatile fuels. The company operates three deep mines and a strip mine to market this coal to commercial and domestic consumers.

2. Suitable cleaning facilities and cleaning-process control are essential if the coal is to compete with cleaned coals from other fields, so the company built a 450-tph cleaning plant and a complete coal-analysis laboratory at Osceola Mills, Pa., to fill these needs.

3. The success of the company is tied to the economic health of the surrounding community. To demonstrate its belief in this principle, Elliot Coal Mining Co. encourages independent business by using to the greatest possible degree the services offered by private enterprises in the district.

The thread of this operating policy, initiated and promoted by Lewis Stein, president, is evident



PROSPECTING in a seam outcrop is a job for a small maneuverable unit which quickly opens a slot for sampling.



PENN NO. 9 is opened into highwall of B seam stripping. Spoil (background) is from an overlying C seam operation.



STRIPPING SHOVEL doubles as loading unit in slot-type recovery that reduces maneuvering.

in the following description of Elliot's activities.

Deep Mining—Under supervision of Thad S. Wayne, vice president, and Peter Ross, general superintendent, the company operates three wholly-owned deep mines—Penn No. 9, Viola and Roslyn—in the 6-ft.-thick B seam. The first two are hand-loading operations. However, at Penn No. 9, two thin partings are cut out by Goodman machines. Roslyn, now in development, is planned for ultimate production of 500 tpd with conveyor transportation. The three mines opened in the highwalls of completed strippings, now produce 700 tpd and employ 120 men.

In addition to the tonnage pro-

duced from the wholly-owned properties, Elliot purchases and cleans the output of 14 small independent mines in the county, thus providing these operations with a steady customer as long as they are willing to load reasonably-clean coal. This strong market, the central cleaning plant described later in this article and Elliot's policy of assisting small operators with the purchase of new equipment have been the difference between profitable operation and closure for many. These independent producers, operating in the Moshannon and B seams, employ about 350 men.

Modern Stripping—In recent years, legal controls governing

open-pit mining in Pennsylvania demand that land reclamation become a definite element in planning. At Elliot's Osceola mine, therefore, the sequence of operations includes logging, clearing, stripping, loading, backfilling and reforestation.

A logging crew with a company-owned saw mill precedes stripping equipment, and the value of sawmill products is applied to the cost of reclamation. Thus, the \$300-per-acre bond, required by the State before stripping can commence, is recovered almost intact for reinvestment in new properties.

Grubbing and clearing is done by a bulldozer, which follows the logging crew to push debris and topsoil into the spoil area. Since the area is hilly, the operations follow the contour at seam outcrop and the initial spoil is pushed down-slope beyond the outcrop. Here the B seam is 50 in thick in two benches of different quality, and overburden averages 40 ft. The upper third of the overburden is topsoil, the middle third is sand rock and the lower third is heavy shale.

Three $\frac{3}{4}$ -yd loading shovels pick up the coal at the loading points in the pit and, when necessary, they scarify unmarketable boney on top of the coal for bulldozer removal.

After the coal is loaded, peaks of the spoil banks are pushed back into the pit on an even slope toward the highwall. R. D. Thomas, assistant to the president in

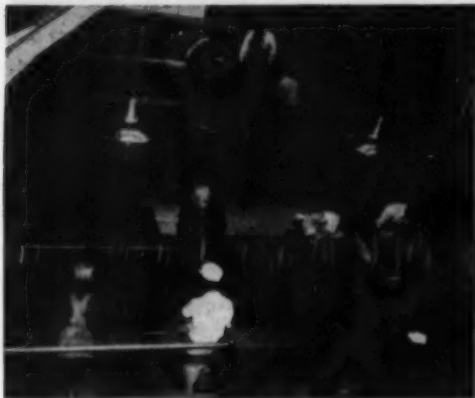
How Elliot Operates to Keep Reclamation in Step With Recovery



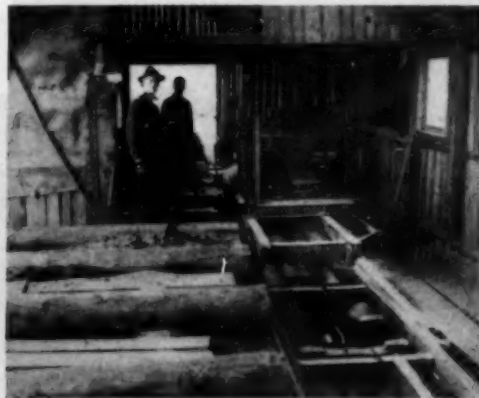
RECIPROCATING FEEDER places coal from feed hopper into conveyor which discharges to a primary crusher in the belt sump.



PLANT-FEED BELT, 42 in wide and 500 ft long, raises crusher product 60 ft to sizing screens in the cleaning plant.



PICKING TABLES for larger sizes discharge to mining conveyor for loading, to recirculating system or to retail bins.



COMPANY SAWMILL produces dimensioned timber from trees cut from areas to be stripped.

charge of planning and reclamation, supervises this work, utilizing the consulting services of Dr. W. C. Bramble, Department of Forestry, Pennsylvania State College, in selecting species of seedlings to be planted on the leveled spoil. Locusts and pines predominate. Reclamation closely follows stripping to keep land recovery on a current basis, and the project must be approved by officials of the Pennsylvania Department of Forests and Waters before the bond is released.

Highwall drilling is done by George Kerr, Osceola Mills, an independent drilling contractor. Mr. Kerr uses a truck-mounted horizontal McCarthy highwall drill. Holes are 54 ft deep on 21-ft centers on a line about 6 ft above the top of the coal.

In the three deep mines, du Pont monobel AA and Lump Coal CC are used for shooting, but in the strippings, George Humphrey, Philipsburg representative of the Austin Powder Co., supervises his own crew in charging and firing highwall blasts. The 54-ft holes provide a 60-ft-wide cut and the average round consists of 20 holes. Each hole is charged with 200 lb of Austin AL dynamite in 5x24-in cartridges, and the round is primed with Austin detonating fuse, a new product.

Three types of dynamite, differing in their detonation velocities, are used in each hole. A high-velocity dynamite, Austin AL-9, comprises half the charge, and is placed in the hole first to break up the heavy overburden at the back of the cut. The remainder of the charge is 25% AL-7 and 25% AL-2,

progressively slower explosives. The slower dynamites heave about 33% of the overburden off the coal. Bulldozers remove about 17%, so the main stripping unit, shovel or dragline, is required to handle only about half the material.

Stripping equipment consists of a 2½-yd Lima and Manitowoc shovels with high-lift fronts, a Bucyrus-Erie 54B dragline and a Lorain 820 dragline. Three ¾-yd Link-Belt Speeders are used for loading and prospecting. Four bulldozers—two Caterpillar D-8's, a D-7 and an Allis Chalmers HD-19—clear topsoil, push soil, maintain access roads and clean the top of the coal. All this equipment is diesel-powered.

In areas where the overburden is too thick to be handled in one lift by a single unit, one of the loading shovels precedes the dragline to



EACH CAR OF COAL, like the first one (left), produced in May, 1949, is sampled and analyzed in the company's laboratory. Laboratory procedure was initiated by Robert Kyte (left), consulting analyst. Carl Vaux (right), is Elliot analyst.



CAR-SHAKEOUT in steel-covered building unloads deep and strip coal to feed hopper. Strip coal is dumped to cars from truck ramp in distance.

construct a bench 25 ft above the coal from which the larger unit can work. The small shovel casts spoil from along the highwall, and the material dropped by the small shovel is pushed into the spoil area by the bulldozer.

In addition to the coal from Osceola mine, Elliot cleans and distributes the production of four contract strippers operating on properties leased to Elliot.

Central Preparation Plant—Designed by McNally-Pittsburg, the new preparation plant at Osceola Mills, which May 18, 1949, processed its first car of coal, is adjacent to the Pennsylvania R.R. yards where trips are made up for the long haul to market. The plant is ideally situated to clean Moshannon Valley coal already in rail transit.

The plant-feed hopper holds two carloads of coal. It is built under a double-track unloading shed which houses a Robins car shake-out on a monorail system to serve both tracks. A car-height ramp to one of the tracks permits trucks from the strippings to unload directly to railroad cars ahead of the unloading shed. The loaded car then is dropped to the shed, unloaded and dropped 450 ft down-track to the loading chutes at the cleaning plant to receive clean coal. Trucks also may be unloaded into the plant feed hopper when empty cars are not available.

The plant, which contains sizing, picking and crushing equipment, produces minus $\frac{3}{4}$ -in slack, $1\frac{1}{4} \times \frac{3}{4}$ pea, $2 \times 1\frac{1}{4}$ nut and plus 2-in lump.

Coal from the hopper is fed to a drag conveyor by a McLanahan-

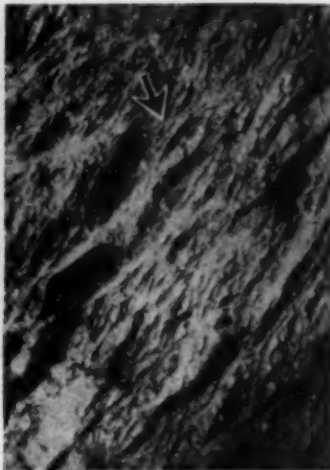
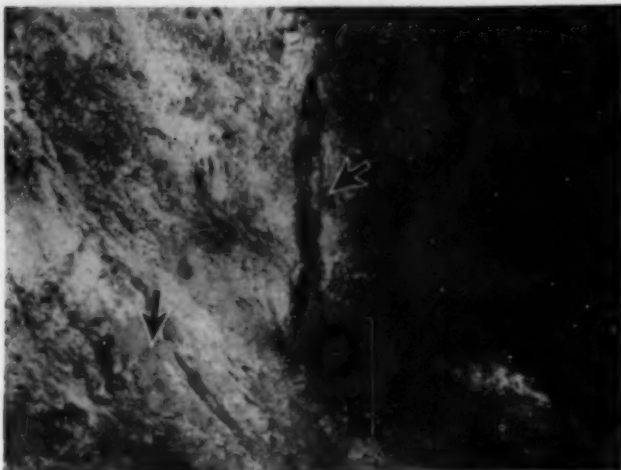
Stone reciprocating plate feeder, the conveyor discharging to a single-roll McLanahan Rockmaster crusher that reduces run-of-mine to minus 6 in. The product of the crusher is raised to the top of the 60-ft-high plant on a 500-ft-long, 42-in-wide Robins belt conveyor and discharged to a $2\frac{1}{2}$ -deck, 6x16-ft Allis-Chalmers Ripl-Flow sizing screen dressed with 2-in, $1\frac{1}{4}$ -in and $\frac{3}{4}$ -in jackets.

The 6x2 and $2 \times 1\frac{1}{4}$ is placed on picking tables where bone and other impurities are removed. Coal from the picking tables may be loaded directly, stored in any of three 50-ton bins for retail sales or passed through a McNally secondary crusher and reduced to minus 2 in. Recirculating equipment, supplied by Lake Shore Engineering Co., consists of a crusher and 15-in elevating conveyor to crush the picked coal and return it to the Ripl-Flow screen for resizing.

Refuse from the picking tables is conveyed to a truck hopper.

A transformer substation steps-down purchased power from 2,300 v to 440 v for motors and 110 v for lighting. Total connected load is 218 hp in 18 main motors and 10 auxiliaries, the largest unit being the 40-hp General Electric Tri-Clad drive on the main belt. Falk Motoreducers are used where speed reductions are called for. The plant is steam-heated from a stoker-fed boiler through Young Verti-Flow blowers, and a comfortable shower- and change-room is provided for the 24 employees.

Rounding out plant equipment is a 62,500-lb-capacity Fairbanks-Morse truck scale with a 40x10-ft platform for weighing outgoing retail coal.



INFUSION AT WORK—Water running out of shotholes, particularly top center (left photo), and darkened rock dust show infusion results. Normally, however, the evidence would be only dampness at the face. Dust occurs on the interfaces of fracture planes and in streaks, such as the $\frac{1}{2}$ -in one indicated in the photo at the right. Wetting this buried dust is the infusion goal.

How Air-Borne Dust Is Reduced by . . .

Pillar-Soaking at Kenilworth

PROBLEM: Suppressing Dust Released by Shooting

SOLUTION: Infusion by Means of Drill Holes

RESULTS: Low Dust Counts and Reduced Heating

BORROWING A LEAF from the Australian book, the management of the Kenilworth (Utah) mine of the Independent Coal & Coke Co. has embarked on a program of water infusion of coal, which so far has shown good results in reducing dust in face preparation and loading. As a result of the Kenilworth tests, infusion also is being introduced into other western operations and is being contemplated in other sections of the country. In addition to reducing air-borne dust to less than the recommended limits, infusion also has been credited with eliminating pillar heating and stopping at least one fire.

Using crawler loaders and shuttle cars, the Kenilworth mine is recovering the Kenilworth bed varying from 9 to 16 ft in thickness and dipping about 5 deg north. Maximum overburden over the present mining areas is about 1,800 ft.

How Dust Is Formed—The coal is of bituminous rank and is very hard. In pillar extraction, however, as a result of the pressure of the overburden, it crushes to powder. It also contains an appreciable percentage of resin, and the dust is one of the most explosive found anywhere in the United States. In addition to streaks or seams of dust up to 1 in or more in thickness—one such streak about $\frac{1}{2}$ in thick is shown in an accompanying illustration—deposits always are present on the faces of all cleavage planes.

Prior to infusion, all the accepted methods of reducing dust were used at Kenilworth and still are. It is manifest, however, that these could not go beyond the surface of the coal. Consequently, when it was shot, large volumes of dust were liberated into the air from the streaks, seams and interface deposits. A second major source is drilling, as well as the dust left in

the holes after drilling is completed. Recently, to supplement infusion, the practice of washing out drill-holes was adopted, and observations indicate that it provides significant help.

Since it was evident that accepted methods did not go as far as necessary, Kenilworth officials were quick to accept the suggestion of an Australian visitor that infusion be tried, and took steps to obtain all available data on Australian practice. In this much help was received from C. O. Newey, district mining engineer, Australian Joint Coal Board, Sydney, Australia, a world-renowned authority on dust suppression in mines.

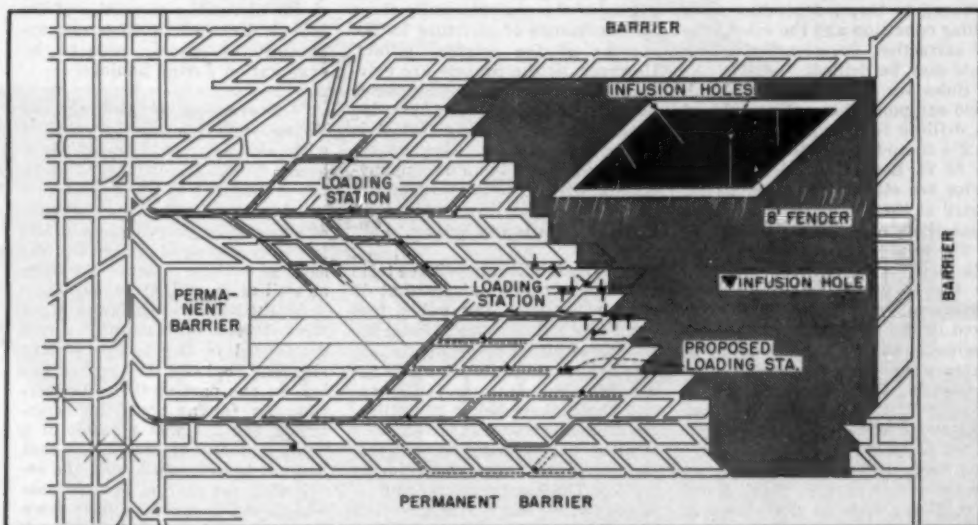
With the assistance of W. M. Merritts, mining engineer (coal), Bureau of Mines, Salt Lake City, the Kenilworth work got under way in the latter part of 1950. Members of the Independent Coal & Coke staff participating in the development of the program included: Walter F. Clarke, general manager; George B. Jackson, formerly general superintendent; E. O. Jackson, now general superintendent; Don Newberry, general mine foreman; Sam Fratto, safety



INFUSION EQUIPMENT—Water is introduced through pipes placed in drill holes and sealed with brattice-cloth packers.



INFUSION MEN—Kenilworth supervisors active in infusion work include: Don Newberry (left), general mine foreman; Dennis Zubeck, assistant mine foreman; John Crocco, section foreman; and Sam Fratto, safety and personnel director.



INFUSION AREA—Plan of pillar section in Kenilworth mine selected for the first test of the infusion principle, showing holes used for infusion at the time this description was prepared, as well as the general layout for trackless operation. Holes for infusion of a pillar usually are drilled along the centers of the pockets used in mining (inset).

and personnel director; Dennis Zubeck, Albert Lee and Henry Trautwein, foremen; John Crocco, section foreman; and Robert H. Morton, miners' safety committee-man.

Pillar-Infusion Methods—A pillar section in the 1st and 2nd West entries off No. 4 slope was selected for the infusion tests.

This section is shown in an accompanying illustration. This area of the mine was developed in 1943 to 1945, and the pillars therefore had been standing a considerable time. As a result, the floor had heaved in some places to within 6 ft of the roof, the pillars had been badly crushed, and much sloughing had occurred. Original coal height was 16 ft. Heaving still is taking

place, requiring repeated bottom lifting during pillar recovery.

As elsewhere in the mine, water is piped under pressure to all working faces for use on cutting and loading machines, for washing down the face before shooting, for washing out drill holes, and for sprinkling the loose coal before and during loading. Sprays also are installed on all main part-

ings and at other points along the main haulageways for wetting the cars. The coal is shot with sheathed permissible.

The accompanying plan of the 1st and 2nd West pillar section shows the location of the infusion holes at the time the material was gathered for this description of the Kenilworth practice. The pillars are diamond-shaped and are nominally 57x132 ft in size. As a result of weight, however, the two sharp points normally crush back up to 40 ft or more, and occasionally the entire pillar is flattened and spread.

Mining of an individual pillar (see accompanying illustration) is done by driving 25-ft-wide places across it, usually from the lower side, leaving 8-ft fenders.

Infusion holes normally are drilled on approximately the center lines of the pockets, as indicated. In other words, a maximum of four usually is put in per pillar, although the number sometimes is reduced to three, depending upon pillar condition and the exact plan of extraction. Occasionally, a fifth hole may be drilled.

Holes are drilled with the hand-held equipment normally employed in drilling for shooting. Diameter is 2½ in and the usual depth is 30 to 35 ft. Regardless of where the holes are started, they are terminated at the top of the coal, or as near thereto as possible.

The water is introduced through 1¼-in pipes 20 ft long connected to the sprinkler lines by hoses. Pressures up to 250 to 300 lb were used in the original holes, but experience indicated that such pressures were unnecessary and, consequently, they were reduced to around 30 to 40 lb by throttling with the pipeline valves. This eliminated blowouts and other difficulties and made special seals or packers unnecessary. Now, about 3 ft of the ends of the pipes are wound with brattice cloth strips secured with friction tape. The pipes are pushed into the holes as far as possible and then are driven to a depth of about 15 ft with a cap piece. There are no leaks. A special sleeve-type seal is used where the places are narrow.

Infusion Schedule — The practice in infusing pillars at Kenilworth is to have the pipes in position and the water started about 30 days ahead of the time pillar operations are to begin. The water is kept running about a week—sometimes more—and then is shut

off. Then, when the first pocket is started, the water in that hole also is started and is kept running until mining reaches the hole.

To increase its effectiveness, the water used in infusion and for other dust-suppressing purposes at Kenilworth is treated with Aquadyne, dispensed from automatic proportioners. In the opinion of the mine management, it is felt that a good job of soaking can be done with 1 to 1½ gal per ton, although more was being used in the early stages of the experiment. To keep the volume to the desired figure and thereby save compound, it is the intention to install meters and use throttling disks.

Under Kenilworth conditions, it is believed that gravity and time are more important than pressure in attaining results, though it is granted that pressure might be more effective in other coals in other operations. With time, the water seeps through the cracks and fissures and along the bedding planes of the coal. Normally there is no evidence of moisture on the surface of the original pillars. However, as the pockets are driven, the surface of the coal becomes damp to the feel and rock dust also changes color, showing that it is taking up moisture. Also, on occasion, as shown in an accompanying photograph, water will run out of shotholes—in this instance all the way from top to bottom.

Infusion Results—Since tests and observations indicate that 40 million particles per cubic foot constitute a dusty atmosphere, the Bureau of Mines recommends that this be the maximum allowable figure. But also, since the concentration can be kept below 20 million, the Bureau recommends that this total be not exceeded as an average over a shift, with 40 million as the top. The numbers refer to dust 10 microns or less in size, since the Bureau considers only such particles in making dust counts.

At Kenilworth, dust counts made with a midjet impinger by the Bureau showed a reduction of 90.1% in particles of dust 10 microns or less in all similar mining operations—drilling, shooting and loading, including loading of stumps. Counts before infusion ranged from 162.3 million particles per cubic foot for loading up to 575.7 for center cutting and 678.6 for pillar shooting. With pillars infused with water only for 72 hr and then left standing for 60 days, the counts for drilling,

shooting in regular faces, and loading were materially reduced, though only loading, with 30 million particles, was below the recommended maximum.

Using a wetting agent (Aquadyne) in the water and infusing for 14 days before and during extraction, the following counts were obtained: drilling, 1.5 million particles per cubic foot; shooting (two tests), 9.73 and 11.86; loading, 5.86; shooting out a stump, 18.3 million particles per cubic foot compared to 678.6 million without infusion and 416.3 million with 72-hr water infusion.

Other advantages of infusion, experience at Kenilworth indicates, include the following:

1. Incipient fracture of the coal, with consequent easing of cutting and, to a lesser extent, shooting.

2. Partial degassing of the coal, thus reducing the possibility of ignition during other operations.

The added moisture apparently has had no effect on screening or on the marketing properties of the coal at Kenilworth. Moisture apparently is greatly reduced by evaporation during haulage.

Prevention of Heating and Firing—Infusion also is credited with stopping what would have been a fire at Kenilworth, and also has eliminated heating where it has been used. Since the outbreak of a fire at Kenilworth must be followed by sealing of the section, the savings both in money and time, as well as in coal, are apparent.

At the time the infusion tests were started, evidence of fire was discovered in the bottom of the sloughed coal and the crushed pillars in one part of the pillar section. As far as could be determined, the fire was a result of a bounce in one of the pillars that had not been infused, with the result that the coal on the low side was moved as much as 20 ft down the pitch. Friction, it is believed, ignited the coal.

The sloughed coal was immediately loaded out and the pillar was drilled with infusion holes 30 ft long and 4 ft down from the top. Introduction of water mixed with Aquadyne cooled the pillar and extinguished the fire within a very short period of time.

All other pillars along the break line in the area also were infused at the same time, with the result that the entire section, which had been almost uncomfortably warm, was cooled to less than the temperature normally prevailing.

Exide-Ironclad

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**ARE YOUR BEST
POWER BUY—
AT ANY PRICE**

They PROVIDE ample power for fast, high-production haulage — more trips per shift, dependable round-the-clock performance, with no end-of-shift slowdown, no unscheduled down time . . . ASSURE inherent safety, with freedom from hazards of fire, fumes, noise . . . SHOW low costs of operation, maintenance, repair, depreciation. SIZES for all makes of battery-powered mine locomotives, trammers, shuttle cars. Call in an Exide representative, and let him prove these facts.

**THE ELECTRIC STORAGE BATTERY COMPANY
Philadelphia 2**

Exide Batteries of Canada, Limited, Toronto

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Determining Trolley-Locomotive Position for Maximum Voltage Drop With Current From Three Sources

By M. H. HALL

Superintendent of Construction
Olga Coal Co., Coalwood, W. Va.

I OFFER the following solution of a dc haulage problem that may be of interest to the readers of *Coal Age*. I have not found a solution in any of the several electrical-engineering texts and handbooks that I have read.

The problem is the determination of the position, L, of a dc trolley locomotive to produce a maximum drop in voltage when the current flows from three sources, A, B and C, as shown in Fig. 1. The resistances shown in all instances are the positive and negative combined.

First, prove that the maximum voltage drop at the locomotive will occur when half of the current of 1,200 amp at the locomotive flows from each direction. This may be done two ways:

1. Write an equation for maximum voltage drop from A or B to L, and from C to L:

$$\frac{(0.04 \text{ ohms}) (X \text{ amp})}{2} + \frac{(10,000 - Y') (0.00002 \text{ ohms}) (3X \text{ amp})}{2} + \frac{(1,200 - 3X \text{ amp}) (0.00002 \text{ ohms}) (Y')}{2}$$

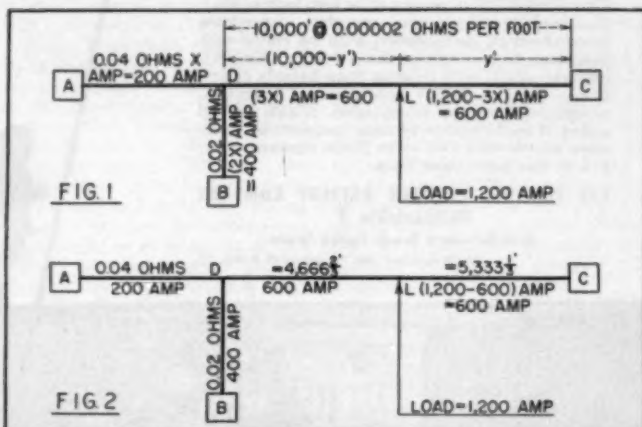
Clearing,

$$\frac{0.64X}{2} + \frac{0.00012XY}{2} + \frac{0.024Y}{2} = \text{a maximum.}$$

By partial differentiation, solve for X and Y:

$$\begin{aligned} \frac{dx}{0.32 - 0.00006Y} &= 0 \\ Y &= 5,333 \frac{1}{3} \text{ ft} \\ 10,000 - Y &= 4,666 \frac{2}{3} \text{ ft} \\ \frac{dy}{-0.00006X + 0.012} &= 0 \\ X &= 200 \text{ amp} \\ AD = X &= 200 \text{ amp} \\ BD = 2X &= 400 \text{ amp} \\ DL = 3X &= 600 \text{ amp, or half the load at L.} \end{aligned}$$

CL = 1,200 - 600 = 600 amp, or half the load at L.



2. Write the maximum I²r (energy-loss) equation for the entire system, or,

$$\begin{aligned} &(0.04 \text{ ohms}) (X \text{ amp})^2 + \\ &(0.02 \text{ ohms}) (2X \text{ amp})^2 + \\ &(10,000 - Y') (0.00002 \text{ ohms}) (3X \text{ amp})^2 + \\ &(1,200 - 3X \text{ amp})^2 (0.00002 \text{ ohms}) (Y') \end{aligned}$$

Clearing,
 $1.92X^2 - 0.144XY + 28.8Y = \text{a maximum.}$

By partial differentiation, solve for X and Y:

$$\begin{aligned} \frac{dx}{3.48X - 0.144Y} &= 0 \\ Y &= 5,333 \frac{1}{3} \text{ ft} \\ 10,000 - Y &= 4,666 \frac{2}{3} \text{ ft} \end{aligned}$$

$$\begin{aligned} \frac{dy}{-0.144X + 28.8} &= 0 \\ X &= 200 \text{ amp} \\ AD = X &= 200 \text{ amp} \\ BD = 2X &= 400 \text{ amp} \\ DL = 3X &= 600 \text{ amp} \\ CL = 1,200 - 600 &= 600 \text{ amp} \end{aligned}$$

Knowing that half the locomotive current flows from each direction and that the voltage drop at L must be the same from all sources, we can determine the position of the locomotive that will produce a maximum voltage drop in the following manner (Fig. 2):

By proportional conductances, 200 amp will flow from A to D and 400 amp from B to D. Write a voltage-drop equation from A to L, place this equal to the voltage drop from C to L, and solve for Y:

$$\begin{aligned} &(0.04 \text{ ohms}) (200 \text{ amp}) + \\ &(10,000 - Y') (0.00002 \text{ ohms}) (600 \text{ amp}) \\ &= (0.00002 \text{ ohms}) (Y') (600 \text{ amp}) \\ 8.00 + 120 - 0.012Y &= 0.012Y \\ 0.024Y &= 128 \\ Y &= 5,333 \frac{1}{3} \text{ ft} \\ 10,000 - Y' &= 4,666 \frac{2}{3} \text{ ft} \\ \text{Voltage drop AD} &= \\ &= (0.04 \text{ ohms}) (200 \text{ amp}) = 8 \text{ v} \\ \text{Voltage drop DL} &= \\ &= (0.00002 \text{ ohms}) (4,666 \frac{2}{3}) (600 \text{ amp}) \\ &= 56.00 \text{ v} \\ \text{Voltage drop A or B to L} &= 64.00 \text{ v} \\ \text{Voltage drop C to L} &= \\ &= (5,333 \frac{1}{3}) (0.00002 \text{ ohms}) (600 \text{ amp}) \\ &= 64.00 \text{ v} \end{aligned}$$

The position L of the locomotive for maximum voltage drop may be computed by conductance and resistance when any number of power feeders are located on either side of the load by keeping in mind that half of the amperes at the load will flow from each direction, as we have proved.



A rare combination and one that puts new meaning into continuous mining. Now, it is possible to maintain a continuous flow of coal from face to entry. The COLMOL advances into a solid seam of coal at a rate from zero to 30" per minute, depending upon conditions, and the MOLVEYOR operates 'snake fashion' behind it, taking coal in a continuous stream to the main transportation system. The MOLVEYOR is flexible and self-propelled (a train of belts); is the logical answer to the intermediate transportation problem. Ask for details covering the two units . . . they work together.



THE JEFFREY MANUFACTURING CO.

Established in 1877

912 North Fourth Street, Columbus 16, Ohio

All Top Facilities Under One Roof Stress Efficiency

COMPLEMENTING the modern mining methods used underground, all surface facilities at Mine No. 40 of the Peabody Coal Co., Corinth, Ill., are grouped in one building for top operating efficiency and added miner con-

venience. Besides the facilities shown here, the building also houses the mine office, repair shop, miners' canteen, lamproom, hoist and generator rooms, as well as an inside entrance to the mine slope.



ONCE THEY ENTER this mine building a short walk from the parking lot, miners need not go outside until they have changed and are ready for the trip home. Inside access to the man-trip car on the slope is shown at the right.



TWO LARGE CHANGEROOMS and modern showers are especially designed for miners' comfort and convenience.



COMPLETELY EQUIPPED first-aid room is modern in every detail.



SUPPLY ROOM is carefully indexed to speed up service.



Mining Tires exactly fitted for their work

When we say "exactly fitted" we mean a mining tire built for the toughest conditions **OFF THE ROAD**, while giving a smooth long-wearing roll on the highway.

This *off-the-road* and *on-the-road* problem has now been solved. Both mining requirements have been fully met and mastered.

These are the facts about the U.S. ROYAL FLEETMASTER which can contribute to a radical reduction in your tire costs.

These U.S. Royal Fleetmaster facts add up to reduced tire costs — increased efficiency — lower maintenance!

- ★ **70% Deeper Traction Tread!** (For complete holding penetration **OFF THE ROAD!** With long-wearing smoothness on the highway)
- ★ **Tougher, Stronger Carcass!** (Permitting even greater additional safe mileage with more recaps)
- ★ **Special Tread Compounds!** (Utmost in cut and chip resistance)
- ★ **Round-Moulded Carcass!** (Natural inflated shape reduces distortion strain)
- ★ **Thicker Under-Tread!** (Your bed-rock for super-traction and mileage)

A phone call does it! To your nearest U. S. Royal Distributor! He's listed in the Classified Telephone Book!

UNITED STATES RUBBER COMPANY

Castors on Baking Oven Reduce Armature Handling

CLOSING THE BAKING OVEN AROUND AN ARMATURE instead of moving the armature in and out of the baking oven has proved to be a preferable arrangement in the repair shop at the Leatherwood (Ky.) mines of the Blue Diamond Coal Co. Heating, dipping, draining and baking are completed without transferring the armature. It is necessary only to hoist it up and down, which is done with a chain block that holds the armature during the entire process.

The top of the 60-gal tank is flush with the floor. After an armature is dipped, the tank is covered with a round steel plate with a center hole and funnel to carry drippings back to the tank. For baking, the halves of the hexagonal infrared oven, mounted on casters, are closed around the armature.

Walls of the oven, which is 56x60 in, are 1/2-in asbestos heat-insulating board. A penetrating heat is supplied by radiation from 36 150-w infrared lamps, positioned in three rows of 12 each. Six circuits, consisting of the alternately spaced lamps of one row, are controlled by individual tumbler switches.

Temperature is controlled by a thermostat actuating an Allen-Bradley magnetic switch and a Westing-



TO REDUCE HANDLING, armature hangs on hoist during entire process. With baking varnish dripping back into tank under floor (left), oven is closed and secured with three clamps (right). Oven heat is supplied by 36 infrared lamps in six circuits, with controls on top of one-half of caster-mounted cabinet.

house De-ion breaker. The oven, which is large enough to accommodate a 300-kw converter armature,

was designed by Ballard Taylor, chief electrician, and built by Harry Bryson, machine-shop foreman.

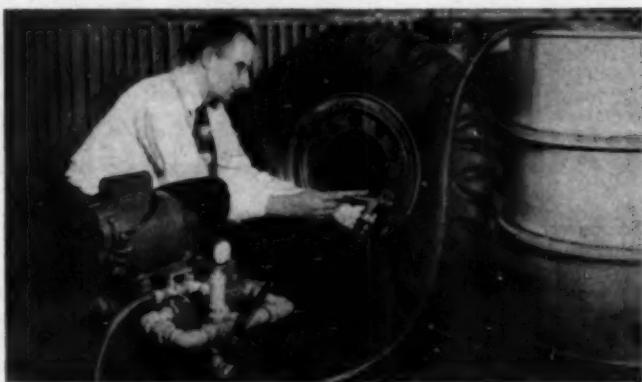
Water-Filled Tires on Underground Machines Lower Operating Costs and Boost Tire Life

SUBSTANTIAL INCREASES IN TIRE LIFE and lowered operating costs for tires used on underground mining equipment and run at low speeds (less than 5 mph) may be accomplished through substitution of 100% water-filling for the conventional air pressure, 2-yr tests recently completed by Goodyear Tire & Rubber Co. show.

Use of the 100% water-filling method permits adequate pressure to be maintained constantly, until the tire is worn out or punctured, the tests disclose. In a water-filled tire internal pressure varies with load, giving minimum pressure when load is light and increased pressure as load increases, which limits tire flexing and reduces cord fatigue in sidewalls. Pressures need not be checked since there is no seepage.

Operators report water-filled tires ride and steer better than air-inflated tires, Goodyear says. Bounce is less, because of the dampening effect of water, and rolling resistance is decreased so that each battery recharge gives longer service and more productive machine time. Elimination of air also removes the hazard of dust from blowouts.

Water-filling eliminates need for in-



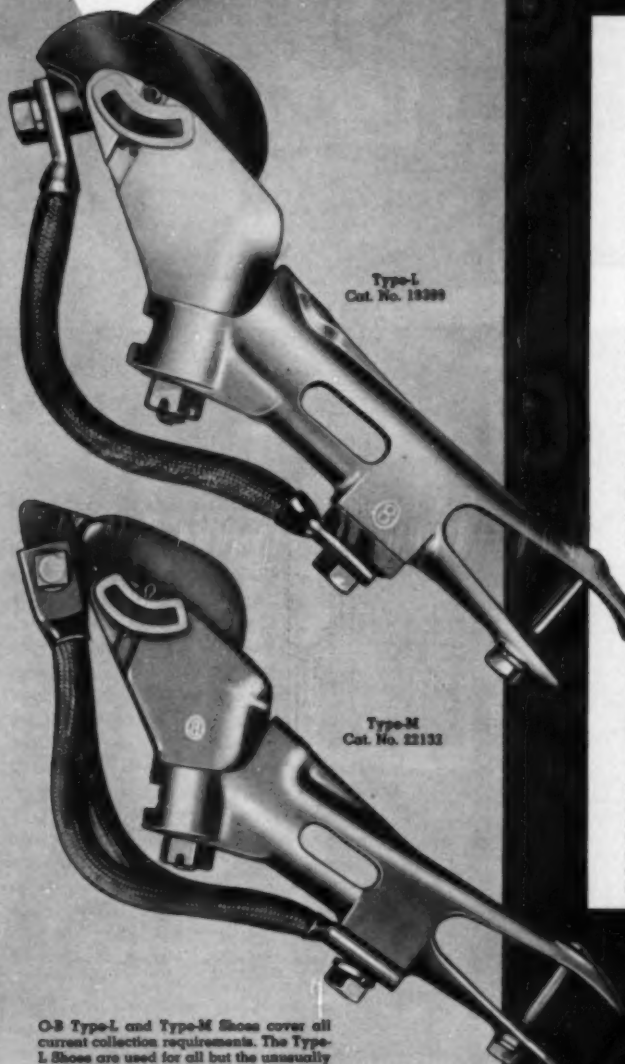
GOOD RIDING AND EASY STEERING are claimed for water-filled tires

flation equipment and personnel for checking and inflating tires underground. It is done with a special high-pressure positive-displacement pump with suitable connections for tire valves obtainable from shuttle-car manufacturers.

Goodyear developed the plan for

using liquid some years ago, under the name "Solution 100," but water-filling of shuttle-car tires is the first time the company has approved such a method for load-carrying vehicles. The approval is possible because shuttle cars, cutters and loaders operate under 5 mph, Goodyear points out.

HAULAGE WAYS Jr.



Type-L
Cat. No. 19399

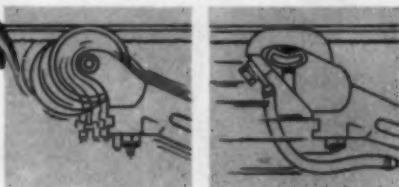
Type-M
Cat. No. 22132

O-B Type-L and Type-M Shoes cover all current collection requirements. The Type-L Shoes are used for all but the unusually heavy current demands, which are met by the Type-M Shoes.

Try This Remedy for Motor Wear

● You can avoid some expensive locomotive maintenance charges simply by switching from wheel to shoe current collectors. Motors take a beating when current collector wheels bounce on the trolley wire. They pull their trips in a "series of jerks" when the current flow is repeatedly interrupted by a bouncing trolley wheel. The damage isn't apparent until the locomotive goes out of service for repairs, and the shop reports show that gears and bearings are badly worn. Worn parts can be replaced, of course, but the damage doesn't stop there. The incessant on-off flow of current, caused by a bouncing wheel, can cause arcing and burning at the brushes and commutator.

Get a smooth, steady flow of current for your locomotives through trolley shoe current collection. You'll get more service from each locomotive, and better collector performance to boot!



Bumpy, pitted wire is common wherever wheels are used. Rough wire and wheels work hand in hand to interrupt current flow to the locomotive repeatedly. Shoes, on the other hand, keep the trolley wire smooth, since they cause very little arcing or burning. They cling to a smooth wire, and maintain a steady current flow to the locomotive.

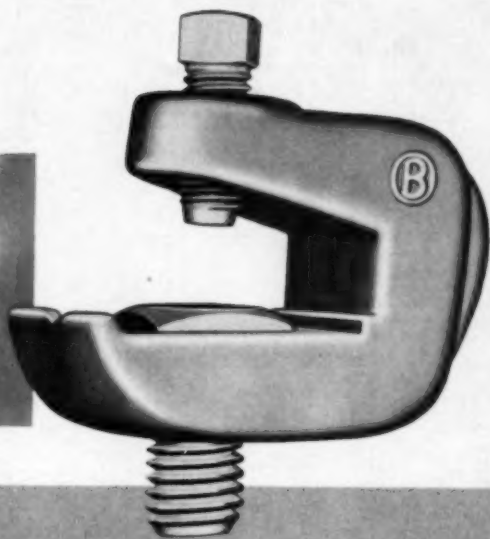
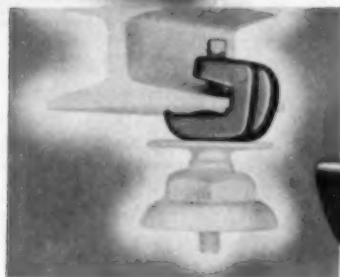
Ohio Brass

MANSFIELD  OHIO, U. S. A.

CANADIAN: OHIO BRASS CO., LTD. NIAGARA FALLS, ONT.

HAULAGE WAYS Jr.

This I-Beam Adapter, with a $\frac{1}{2}$ inch bolt for hanger attachment, is Catalog No. 21846.



I-Beam Adapters Speed Overhead Installation

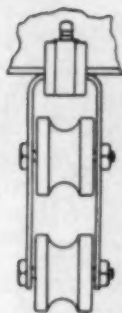
● Handy little clamps which speed much of the routine work in overhead construction, these O-B I-Beam Adapters are also frequent life savers when some temporary job must be improvised in a hurry. They slip over the edge of an I-Beam flange readily, or over similar structural steel shapes measuring a half inch or less in thickness. Hangers, insulators, guard board straps, feeder wire racks, either singly or in combination with other O-B line materials are quickly, securely fastened to the steel to make durable, permanent installations.

The adapter can be ordered with or without a $\frac{1}{2}$ -inch bolt which rests in a recess on the lower arm of the clamp. Furnished with the bolt, the adapter is used with any fitting provided with a $\frac{1}{2}$ -inch tapped boss. Without the bolt, the same clamp is used with any fitting that uses a metal strip or a clevis for support.

We've shown but a few uses here. Why not do some experimenting with some I-Beam Adapters yourself? For adapters with studs, ask for Catalog No. 21846; without the stud, the number is 21845.



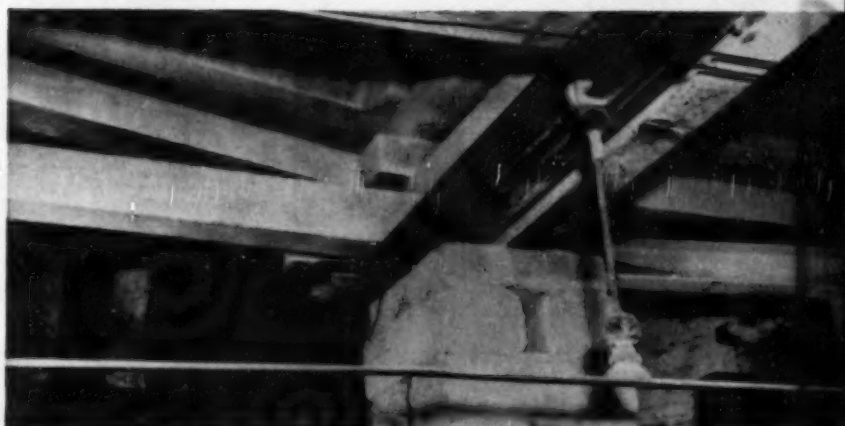
For clevis and strap-held accessories, this Adapter is Catalog No. 21845.



Two line drawings show how the I-Beam Adapter holds trolley and feeder materials to the I-beam roof support.



Trolley wire is easily held at one level with construction of this sort. An I-Beam Adapter with a $\frac{1}{4}$ inch stud has been used to hold the assembly to the I-beam roof support.



Ohio Brass
MANSFIELD OHIO, U. S. A.

CANADIAN OHIO BRASS CO. LTD. NIAGARA FALLS, ONT.

Both the trolley wire and the guard board are held by this assembly of O-B Trolley materials, which is held to the roof with O-B I-Beam Adapters.

HAULAGE WAYS Jr.



The pyramid-like shape of the mating heads prevents any chance of binding when the heads draw apart.



Quick **UNCOUPLING** speeds coal haulage

Only one moving part in the locking mechanism - the locking cam - lifts completely out of the way when the heads uncouple. Thus there are no parts "dragging" as one head slips away from the other.

● When we talk of coupling action in an automatic mine car coupler, people usually think of the action that takes place when cars come together. Uncoupling ought to be a consideration, too, for it is fifty per cent of the coupler's function. Mating heads should come apart just as freely as they come together.

O-B Automatic Mine Car Couplers meet this important requirement readily. Binding between heads is ruled out by the contour of mating surfaces, and there is no chance for dragging as the heads move apart, for the only moveable part, the locking cam, which holds coupled heads together securely, lifts completely out of the way when the heads are uncoupled. Operation of the locking cam by a lever at the side of the car keeps men out of the dangerous "between cars" area. Uncoupling is done without any effort - the locking cam releases smoothly, and the heads slide apart without hesitation.

Speed your haulage system, and make it safer, with couplers that uncouple without trouble - with O-B Automatic Mine Car Couplers!



Ohio Brass
MANSFIELD OHIO, U. S. A.
CANADIAN OHIO BRASS CO. LTD. NIAGARA FALLS, ONT.





HARRY BRYSON, machine-shop foreman, demonstrates the special trimmer for shaping built-up edges of a screw conveyor.



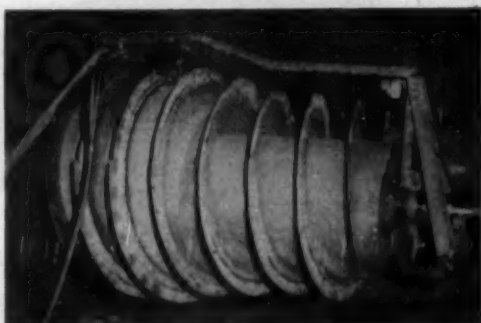
TORCH CARRIAGE rides on four wheels along the top of the T-iron flanges and on one wheel underneath at the center.

Special Jig Accurately Trims Built-Up Filter Screw

STEEL-PLATE SEGMENTS welded to the edges to build up the worm screws of Bird filters are quickly trimmed to proper contour by a cutting torch riding a special jig designed by Ballard Taylor, chief electrician, and Harry Bryson, machine-shop foreman, at the Leatherwood (Ky.) mines of the Blue Diamond Coal Co.

The torch holder is attached to a carriage that rides along a T-iron track properly shaped to obtain the graduated diameter. The carriage has four wheels riding on the top and two in the center riding on the bottom. Edges of the screws are hard-surfaced after trimming.

The new 700-tph preparation plant at Leatherwood mine is equipped with two Bird filters for dewatering fine coal and also uses two Bird polishers for water clarification.

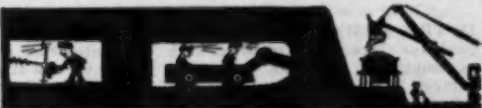


TORCH-CARRIAGE TRACK is built with proper slopes to insure accurate graduated trimming of screw edges.



Bulletin Board Shows Tonnage By Sections and Shifts

WITH THE NEW BULLETIN BOARD recently erected at Mine No. 15, West Virginia Coal & Coke Corp., Stirrat, W. Va., it's no chore to keep up-to-date daily the ranking of the various sections by tonnage produced. Nameplates for each section on both shifts have screw eyes that fit on hooks opposite the place rankings and are easily moved as tonnage figures for the latest shift become available. Under the space at the top for highest producing section in the last 24 hr, a large slogan, "SAFETY FIRST, 'Be Careful,'" emphasizes the company's interest in safe operation.



EASY MONEY—For your cost, time- and trouble-saving ideas, COAL AGE pays good money upon publication. Write to The Editor, COAL AGE, 330 W. 42 St., New York 18.

The Foremen's Forum



This Simple Form, A Result of Applied "Gray Matter,"

Begets This Bounty:

1. Closer work schedules and fewer of the headaches that accompany endless emergencies.
2. Fuller knowledge of how misuse and overloading of machines cause excessive outages.
3. Better job-standardization for tasks that are done over and over in a mechanized mine.
4. Wider recognition of the needs and limitations of the maintenance department.

Morrisdale Coal Mining Co.	
MAXTON SLOPE	Date.....
TROUBLE REPORT	
EQUIPMENT NAME AND NUMBER	UNIT NO.
DATE AND TIME OF TROUBLE	DATE AND TIME REPAIRED
NATURE OF TROUBLE	
CAUSE OF TROUBLE	
Time Out of Service.....	
Delay.....	
Final Inspection and Remarks.....	
MECHANIC (LIST ALL REPAIR PARTS USED ON BACK)	

Big Oaks From Little Acorns Grow!

Seemingly Simple Plans or Ideas Can Bring Big Results If They Are Well Thought Out—Here's One From Willis Baumgardner, Maintenance Supervisor of Morrisdale Coal Mining Co., With a Bonus—SEX!

IN THIS BUSINESS of writing for *Coal Age* there are no problems such as empty-car shortages, equipment outages, storm-caused ravages or soft bottom. There is, however, the problem of giving expression to the subject chosen for discussion. It is comparatively easy to select a subject from among the thousands that would interest mine supervisors, but illuminating the chosen facet by placing one

word after another on a blank sheet of white paper is a horse of another color. Or coal of another cleat. Sometimes they jell, sometimes they don't.

And so, having encountered horses, cleated coal and jelly in one paragraph, we take leave of figures of speech. (In the nick of time, I'd say, as Ivan Given reaches for the blue pencil.)

But don't feel sorry for me—I draw

a good salary, and this month's tome is tailor-made. It came about this way:

Some time ago I chanced to meet an old friend, Willis Baumgardner, electrical and mechanical engineer of the Morrisdale Coal Mining Co., Morrisdale, Pa.

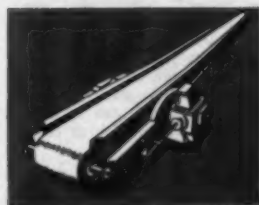
We're serious now. Mr. Baumgardner, in the course of the conversation, mentioned the reports his men submit to him at the close of each day's work. Full credit for the material that follows goes to Mr. Baumgardner. It's his idea.

Upon taking over as maintenance supervisor at Morrisdale, Willis was plagued by the ills that confront many master mechanics and production foremen. He felt as though he was understaffed because there were too many emergencies demanding the services of

**Staying
Power
in Mine
Equipment**

Upped

BY THESE 4 STEPS



1st step: Examine Cities Service lubricants for out-and-out quality through your purchasing experts or test facilities . . . or from service records established by critical users.

2nd step: Look into the completeness of the Cities Service line as an aid to simplified ordering and prompt, steady supply . . . backed by the extensive facilities and intensive cooperation to keep you out of any lubrication "jam".

3rd step: Review mining's most effective

lubrication practices by consulting that fully informed specialist, the Cities Service Lubrication Engineer.

4th step: Ask for facts about the high character of the Cities Service line and the practical technical assistance now upping mine machinery staying power for many of the "hardest drivers". Phone or write CITIES SERVICE OIL COMPANY, Room 56, Sixty Wall Tower, New York City 5. Or get in touch with the Cities Service office nearest you.

CITIES  SERVICE
QUALITY PETROLEUM PRODUCTS

his available men. It all added up to a mad scramble.

Being reluctant to "beat his head against the wall," so to speak, he resolved to attack the problem from an engineering standpoint. He then proceeded to carry out the resolution by (1) gathering information, (2) sifting pertinent facts from this information, (3) deciding on a course of action and (4) forcing the action. It worked!

Point by point here's how Willis made headway.

1. Gathering Information

There were two ways to proceed. Knowing that mining men will mine coal at the face, in the tavern, on the corner and in the boss' office after the shift, Willis could have heard the trials, tribulations and triumphs of his maintenance staff while sitting at his desk. Or he could solicit written daily reports from the electricians and mechanics.

He chose the latter because the reports would give him only the information he wanted — while the "bull session" would provide atmosphere and background. Now, sex rears its ugly head, and here's how we tie that in. Mine mechanics and electricians are males. Some males are sometimes stubborn as mules. Mules! This is sex?

At first there was some "resistance" to the chore of writing daily reports, but Willis explained to the men that the information he could get from the reports would eventually make their jobs easier. To his delight, Willis discovered it wasn't resistance he faced, but skepticism; when the purpose of the reports was explained the men went for the idea.

The first requirement was to decide what information was vital and which facts would have a bearing on the successful improvement of Morrisdale maintenance. Keeping in mind the prime concern of a good supervisor, the people he directs, Willis applied some thought to setting up his report form. He finally decided on a natural breakdown according to three T's—Time, Task and Tools.

Time elements include the date of the report, time by-the-clock when the work is done during the shift, and the length of time required for the job. Task information includes a description of the machine or installation upon which the work is done and the parts required. Under remarks, the repairman enters the tools he used and the tools he could have used.

The plan was put into effect and, during the early days, when there were not enough submitted reports to serve as a basis for conclusions, Willis used the time to instruct and supervise the men in filling out the forms. However, it wasn't long until well-prepared reports were the rule. The flow of usable information had begun across his desk.

2. Sifting Facts

Some more or less legitimate synonyms for the word sift are collate, winnow, cull, analyze and study, and Willis applied all these to the facts he gathered from his men's reports.

A searching examination of facts revealed that maintenance is subject to statistical analysis, and if statistical analysis can do as much for maintenance as it has done for preparation then collection of pertinent data is a worthwhile venture for mine supervisors.

Willis found that on the basis of the reports he could predict within reasonable limits the dates on which units should be overhauled. (Morrisdale's Maxton Nos. 1 and 2 mines are conveyor operations equipped with shaker conveyors and duckbills and the necessary cutting machines, locomotives, pumps, preparation units and so on.)

Also, he could find indications of improper use of machines and auxiliaries, thus permitting him to advise production supervisors when machines were overloaded or misused. Finally, he assumed closer control of his men because their reports covered their assigned jobs as well as anything they were asked to do by others or the jobs they did on their own. All these benefits brought Morrisdale maintenance under closer control and more in line with scheduled procedures.

3. Selecting a Course of Action

Willis could see from the reports that spare units would solve many of his problems by permitting the tight overhauling schedule he deemed necessary. This need for spare units might be self-evident, but then it

might not be so. However, since he was armed with facts, he found his immediate supervisors—R. M. Hess, vice president in charge of operations, and Bob Emigh, general superintendent—agreeable.

With spare units on hand, Willis was in a position to make some permanent assignments in the shop and underground, thereby reaping the benefits of job specialization. The atmosphere of emergency began to clear up, and maintenance men and supervisors no longer felt as though they were being choked.

4. Forcing Action

In this usage, the word forcing applies to Willis, himself, and not to his relations with management, men or other supervisors. The job of smoothing maintenance is his, and he must perform at a high level to hold the job. To help himself he developed this idea and he now must promote it for all it's worth. After all, he expended thought and energy in its development, so he realizes that added energy will be required to make it pay off in lower maintenance costs.

Willis' report form, shown in the illustration, is clear, concise and complete. However, it may be changed as experience dictates, Willis says. We commend this form, or your own adaptation of it, to your consideration.

Feeling somewhat better now, and therefore, desiring to alter the moaning tone of the first paragraph, it is only proper that I should let you know that arranging Foremen's Forum will be a lead-pipe cinch as long as men like you and Willis continue to come up with good ideas. It is a pleasure to present such ideas in the hope that others in the business may profit from them.

Short Lifts

I know a man who is classed as very wealthy. He is the largest single stockholder in several of our largest corporations, has interests all over the United States and elsewhere in the world. He recently gave \$12 million to charity. He owns a farm, and has worked harder on this farm the last four years than he has on anything else he ever owned. "Why?" I asked him. And he said, "To make a profit." Last year he was thrilled and boasted openly that his farm cleared \$700. Why, may I ask you, did such a man adopt this attitude and spend the many hours of his valuable time? Was it because he craved money at a time when he gave away \$12 million? No, anyone can see that he didn't want the \$700. Under our system of free enterprise he was inspired to be successful in whatever he tried to do. Like an artist, musician or author, he wanted to be a success in the eyes of

his fellow-men, not a failure. That is incentive! We must not lose that incentive.

—L. Russell Kece, President, Sinclair Coal Co.

Every good play or story has a villain or a hero. The drama of management communication has both. The villain is this mysterious, non-existent fellow known as "they." All of us blame things on "they." "Oh, 'they' are against that," or, "Why break my neck, 'they' wouldn't appreciate it anyway." Who is this "they"? Your boss, his boss? It must be somebody. Whenever you catch yourself passing the buck to "they," you can be sure you're not doing a good job of communicating.

—Daniel Rockford, Employee Relations Dept., Standard Oil Co. (N. J.).

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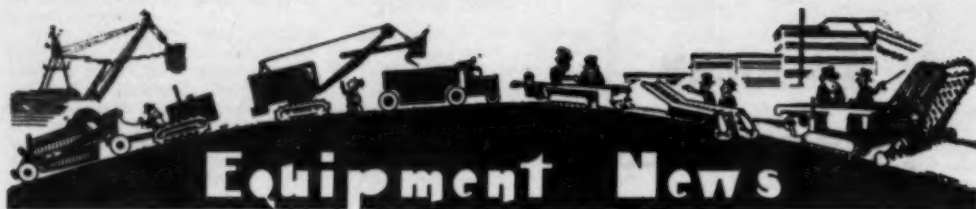


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Drilling Unit Features Hydraulic Feed and Steer (1)

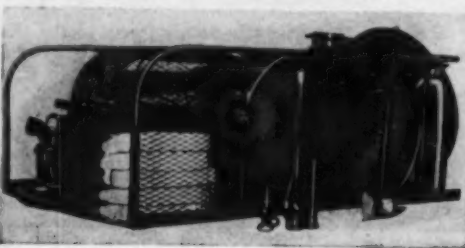
New Superior completely hydraulic drilling unit, on rubber or track-mounted, has hydraulically-actuated arm motion, steering and drill feeding at variable speeds for any size of auger. The unit trams at speeds up to 4 mph and is designed for safe, fast drilling in mechanical-mining cycles, the company reports.—Dooley Bros., Peoria, Ill.



Compact Motorized Pulley Provides Safe, Simple Conveyor Power (2)



Schrock motorized head pulley, combining low maintenance costs, compactness, safety and simplicity of operation, is a steel drum which contains within itself the motor and reduction gears. A torque arm at one end of the drum is attached to the conveyor frame to prevent the motor from rotating as it drives the pulley. Leads to the motor enter the head pulley through stationary conduit in the hollow hub, and holes in the drum provide ventilation for motor and pulley. The reduction gears are enclosed between two oil-tight partitions, and motor oil in this compartment provides a lubricating bath for the gears and front bearing of the motor. The oil bath and small number of moving parts reduce maintenance, no more time is required to install the entire unit than to install an ordinary head pulley alone and the lack of external moving parts increases safety, the manufacturer states. The unit is available for drives up to 60 hp.—Idaho Sprocket & Machine Works, Boise, Idaho.



Portable Fire-Fighter Slides Into Truck (3)

Porto Pumper, a new palletized fire-fighting unit, quickly converts any truck into an effective fire apparatus, the maker reports. Basic equipment consists of a water tank with capacity in excess of 200 gal; hose rack with a capacity of 600 ft of 1½-in discharge hose; a demountable gasoline-powered pump of the rotary, positive-displacement type with rubber gear construction; supply hose, 200 ft of fire hose, an aluminum extension ladder, fire axe and hand extinguisher, straight-stream nozzle, and combination fog and straight-stream nozzle. The pumping unit is readily demounted and may be carried to water source, such as hydrant, well, ditch, pond or stream, and rubber gear

construction permits use of dirty or clean water, according to the manufacturer. The pallet-model Porto Pumper can be easily removed from the truck to release this equipment for other purposes.—Porto Pump, Inc., Detroit 7, Mich.



Conveyor Limits Degradation (4)

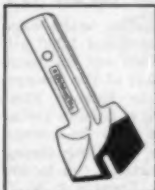
Link-Belt Flexmount, a new oscillating trough-type conveyor, handles a great variety of loose bulk materials at moderate capacities. The design of the unit features the use of a one-piece metal trough with high sides, supported on simple one-piece flexible members that function as springs in absorbing the energy of trough movement at each end of the stroke. Troughs, which are normally 4' in deep and from 8 to 24 in wide, are made of 10- or 12-gage

Service Engineer Helps Improve Cutting in Customer's Mine



Kennametal representative Max J. Caylor, of Mars, Pa., after selling a set of Kennametal U-8 Machine Bits, went into the mine to watch them in operation. He was able to suggest a change in the operating technique for the cutting machine. Some months later, the Mine Electrician stated that they were saving enough on feed ropes, friction parts, and controller parts to pay for the Kennametal Bits they were using.

Special Bit for Hard Roof



Kennametal Bit, Style HFD, makes rotary drilling feasible in slate, shale, and laminated sandstone. Its cutting edges are Kennametal cemented carbide,

thickened to resist shock, and lengthened for greater resistance to gage loss. The bit fits in a special inexpensive Bolting Rod (hollow drill rod, where water is used). Ordinary coal drills, or special roof bolting rotary drills, are used to power the bit. Fast drilling speeds are given and low cost drilling results. Bits are \$5.70 to \$6.95 each.

Low Cost Coal Bit

Low cost drilling is given by the Kennametal Style D Coal Bit because of its long drilling life and fast speed. It drills most rock encountered in the seam at a fast speed, without causing drills to overheat. Special features: (1) Kennametal cemented carbide tips, (2) Better balance between speed and bit life, (3) More efficient cutting action due to "rake angle" of tip, slope of insert, and prong clearance.

(Advertisement)

New "UR Series" Kennametal Machine Bits



For faster cutting where shock conditions are severe, such as in the Continuous Miner, and in seams with large amounts of rock and other hard impurities

The new Kennametal UR Series Mining Machine Bits are designed for use where cutting conditions are extremely severe. Like all Kennametal Bits, the UR Series features a cutting edge of high quality Kennametal Tungsten Carbide — the material that resists wear and shock better than any other carbide.

The deep, inserted Kennametal tip is held firmly on 4 surfaces. Because it keeps cutting, even under the severest shocks of tearing and ripping action, the Kennametal UR Bit is the most efficient bit you can use in a continuous miner, or for cutting seams containing rock and similar impurities. Because the Kennametal Tungsten Carbide tip is both hard and tough, users get more cutting per shift, with less down time and fewer resharpenings.

Kennametal UR Bits, used in both continuous and regular type mining machines, are already reducing cutting costs in a variety of rugged, rock-laminated seams. Your Kennametal representative will give you the performance story, and he will be glad to demonstrate them on a tough cutting job in your mine. Contact him today! Kennametal Inc., Latrobe, Pa.

*Names of Kennametal Representatives appear
in the McGraw-Hill Mining Catalog*

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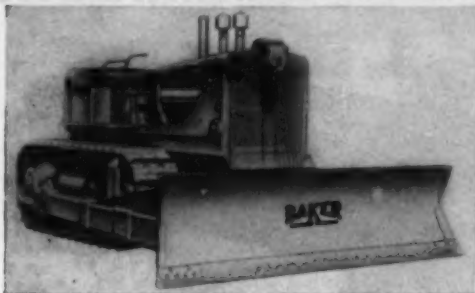


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steel—stainless, corrosion-resistant or other special types. Motion is imparted by a roller-bearing constant-stroke eccentric. Available in lengths up to 100 ft, the troughs may be divided for conveying several materials simultaneously, with discharge possible at any point. Full details in Link-Belt Folder No. 2378, available on request.—Link-Belt Co., Chicago 1, Ill.

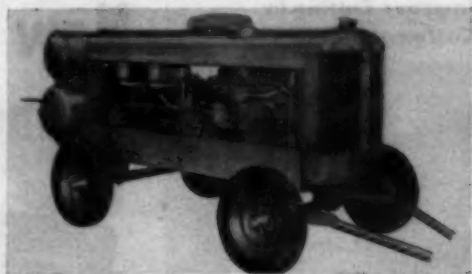


Cable Control for Tractor Attachments (5)

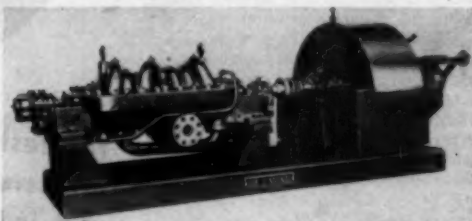
Redesigned cable-control mountings for Allis-Chalmers HD-9, HD-15 and HD-20 tractors provide maximum visibility, easy interchangeability, improved protection for cables and radiator, and a new push-beam power tilt. Bulldozer, grader and rooper attachments now may be changed by removing two bolts and wedges from the lower sheave block and detaching the block. New power tilt eliminates jacks or pry bars in raising or lowering the push beam. A new line of hydraulically-controlled attachments for Allis-Chalmers tractors, including HD-8, also is announced by the maker.—The Baker Mfg. Co., Springfield, Ill.

Compressor Parts Fit Drive Engine (6)

In Schramm's new Model 210 Unistage compressor, 90% of the engine parts are interchangeable with those of the compressor. This simplified design eliminates two-staging and intercooling, the company reports, and requires a smaller inventory of parts. Actual delivery is 210 cfm and the 6-cylinder unit is designed for continuous



24-hr service. Among the other features are electric starting, speed control, cam-operated mechanical intake valves, dual fan belts and Pneumastat control, which reduces fuel costs up to 50%, the manufacturer states.—Schramm, Inc., West Chester, Pa.



Opposed-Impeller Pumps Ease Thrust (7)

New line of De Laval opposed-impeller multi-stage pumps, designed for duty up to 1,000 gpm and 1,200 psi, have horizontally-split casings with suction and discharge nozzles on opposite sides of the lower half of the casing. Impellers are mounted back-to-back to balance axial thrust, and volutes are staggered 180 deg to balance radial thrust. Known as "Opeller" pumps, the 4-, 6- or 8-stage units also feature special designs for handling strong caustics or for high-temperature applications (up to 400 deg F).—De Laval Steam Turbine Co., Trenton 2, N. J.

Cathodic Protection Stops Corrosion (8)

Harco Corp. announces the extension of its services to include the engineering, design and installation of cathodic devices to stop corrosion of pipelines, water tanks, cables and so on. To protect water storage tanks, for example, ac is converted to dc in a transformer-rectifier unit and fed to anodes inside the tank. Current radiates from the anodes in all directions to the underwater steel surface to oppose the electrochemical action of corrosion. In underground applications, soil is the electrolyte and dc power is impressed upon the anodes to radiate through the soil to the metal surfaces, thus preventing chemical action. Cathodic protection eliminates corrosion in most cases up to 100%, resulting in lower maintenance costs, less down time, elimination of the use of excess material for "corrosion factor," lower depreciation rates, and greater protection against personal and property damage, the company states.—Harco Corp., Cleveland, Ohio.



New Vertical Capacitor Motors (9)

New single-phase, vertical Tri-Clad motors, in ratings from $\frac{1}{4}$ to 5 hp, feature standard-dimension mountings, quiet operation and interchangeability with polyphase motors of the same size for small pumps, according to an announcement of General Electric's Small and Medium Motor divisions. Also offered, for motors rated

at 2 hp or less, is an automatic thermal protective device which disconnects the motor from the line when the limiting temperature is reached because of overload, high ambient temperature, inability to start, and so on.—General Electric Co., Schenectady 5, N. Y.

Air Motors Crank Large Engines (10)

New Ingersoll-Rand air starting motors are designed to crank diesel and gasoline engines with piston displacements up to 3,500 cu in. The small and compact air motors, normally operated by compressed air, eliminate generators and batteries and costs of battery maintenance and replacement, the manufacturer says. The new units are easily installed because the air motor can be rotated on the gear case and the gear case can be rotated on the motor housing to clear projections. Starters are available in two sizes: 9BM, which requires about 7 cu ft of air per start and develops 10 hp, and

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20BM, which develops up to 41 hp and requires about 16 cu ft of air per start. The smaller size weighs 40 lb, and the larger, 103 lb.—*Ingersoll-Rand Co., Phillipsburg, N. J.*

New-Equipment Shorts



(11) **PIPE COUPLINGS** — Wade "Quick-Lok" pipe couplers, designed especially for industrial use in compressed-air or water lines, may be used with plain-end pipe to provide a leak-proof, flexible joint without the use of tools. The aluminum-alloy couplings are tested to 300 psi and a special rubber or neoprene "Loks-in" gasket assures positive sealing under operating pressures.—*R. M. Wade & Co., Portland, Ore.*

(12) **WETTING-AGENT INJECTOR**, for use with fire-fighting systems, accurately proportions wetting agent in controlled concentrations of from $\frac{1}{4}$ to 3 gal of wetting agent for each 1,000 gal of water, which tests prove is the effective requirement for all uses from solid stream to foam. Inject-in-line proportioners may be recharged under full pump pressure.—*American Marine Paint Co., Solvold Division, San Francisco, Calif.*

(13) **NEW LOW-SPEED GEARS** improve pusher-loading performance of Caterpillar DW-10 tractors by reducing first-gear speed of DW-10 tractor from 2.8 mph to match second-gear speed of D-7 and D-8 pushers. Increased push-loading efficiency and greater tractive effort for self-loading are provided, the company says.—*Caterpillar Tractor Co., Peoria 8, Ill.*

(14) **CALCULATING CHARTS**, for payroll computation, billing, costing, per cent markup, extensions, area coverage and other similar applications, are faster, more accurate and quieter than machines, the manufacturer says.—*Delbridge Calculating Systems, Inc., St. Louis, Mo.*

(15) **MICRO BAROGRAPH**, designed for use as a base recorder in altimeter surveying, records a pressure curve over a range of plus or minus 1 in. of mercury at elevations of from sea level to 10,000 ft. The 24-hr chart produced by the inkless machine is readable to 0.001 in. mercury and time intervals of 1 min. The 11x16x20-in. unit weighs 30 lb.—*American Paulin System, Los Angeles 15, Calif.*

(16) **VIBROLATOR** aids movement of coal and other materials that arch and resist movement toward hopper

*For Coal Loading
For Coal Stripping*

Four Powerful MARION MACHINES

In the $\frac{3}{4}$ to $3\frac{1}{2}$ cu. yd. size range

MARION 33-M—Available as a $1\frac{1}{2}$ cu. yd. coal loader or as a standard $\frac{1}{2}$ cu. yd. machine. Shovel boom length is 18', handle length 14'-5". Dragline boom length, 35' to 50'. Equipped with MARION Air Control. Ball pull, 23,350 lbs.

MARION 43-M—Offered as a $1\frac{1}{2}$ cu. yd. coal loader or a standard 1 cu. yd. shovel. Shovel boom length is 21'-6", handle length is 16'-4". Dragline boom length, 35' to 50'. Equipped with MARION Air Control.

MARION 362—As a coal loader, the MARION 362 is equipped with a $1\frac{1}{2}$ cu. yd. dipper, a 28'-0" boom and 21'-8" handle. As a stripping shovel, the 362 carries a $1\frac{1}{2}$ cu. yd. dipper on a 28' boom and 21'-8" handle. Dragline boom lengths from 50' to 70'.

MARION 93-M—As a coal loader, the MARION 93-M carries a $3\frac{1}{2}$ cu. yd. dipper, a 34'-0" boom and a 23'-4" handle. As a stripping shovel, the 93-M is equipped with a 2 cu. yd. dipper, a 34' boom and a 27'-6" handle. Dragline boom lengths from 50' to 80'.

If your coal loading or stripping operations call for a shovel or dragline in the $\frac{1}{2}$ to $3\frac{1}{2}$ cu. yd. size range, be sure to get the complete story on these four MARION machines. Contact your nearest MARION distributor or District office or write to the factory at Marion, Ohio.

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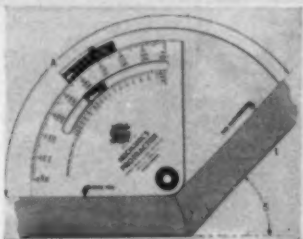
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or bin outlets. The noiseless, self-lubricating unit is available in different sizes and may be mounted in different ways for varying conditions, materials and equipment. The lightweight unit starts instantly, is economical in operation and maintenance and will not jam, the company states.—*Martin Engineering Co., Kewanee, Ill.*

(17) **DRY CHEMICAL FIRE EXTINGUISHER**, known as Ansul 4-B, features ease of operation, flexibility in fighting overhead or ground-level fires and maximum effectiveness for inexperienced operators. In operation, 4 lb of dry chemical is ejected from 12 to 15 ft through a self-closing nozzle and 15 1/4-in hose by a carbon-dioxide cylinder. The unit weighs 10 1/2 lb charged, and has B2, C2 rating from Underwriters' Laboratories.—*Ansul Chemical Co., Marinette, Wis.*

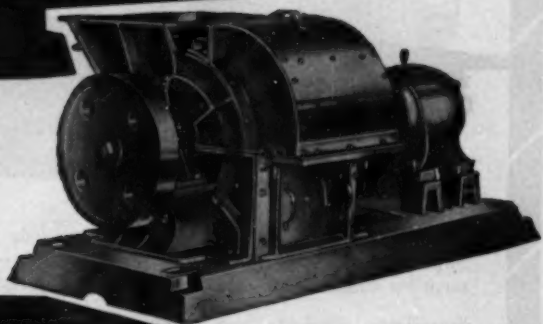


(18) **MECHANIC'S PROTRACTOR**—New protractor gives readings for outside angles, inside angles and inches per foot against degrees up to 24 in per ft (63 deg 26 min). Constructed of vinylite plastic, the protractor is not affected by grease or water and will not burn, warp or become illegible. Size, 3 1/2 in. Weight, 1 1/2 oz.—*Interstate Sales Co., New York 3, N. Y.*



(19) **LIGHTWEIGHT DUST HOOD**, designed for use with or without respirator, is effective in atmospheres containing heavy concentrations of ir-

**2,574,000 TONS
CRUSHED COAL**
(WITHOUT OVERHAULING)



**23 Year Old
AMERICAN CRUSHER
Now Ready For
NEW Career**

Far from being ready for retirement, the 23-year-old American Crusher, whose rotor is shown here, was recently overhauled and transferred to its new home at the Arkwright Mine in Morgantown, West Virginia—where it is now prepared to start a new and productive life.

Since 1927 this mechanical "old faithful" has reduced over 2½ million tons of 6-inch lump to minus ¾ inch screening—at a total parts-replacement cost of only \$.0007 per ton (including the recent reinstallation costs).

Only such features as the exclusive, patented Shredder Ring—originated and perfected by American—could produce such long-lived, economical performance as shown in this typical case history. When you plan to purchase a coal crusher, plan to investigate the built-to-produce American Rolling Ring Crusher.



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American **PULVERIZER COMPANY**
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SuperDuty Tables Prove Ability to Increase Coal Washing Profits

It isn't only the Diagonal Deck that has made the SuperDuty Coal Washing Table a profitable investment for hundreds of coal operators, large and small.

SuperDuty efficiency and economy stems, rather, from a combination of the diagonal deck, head motion and factory aligned under-construction. All of these factors, working together, have proved so efficient in washing the fine coal sizes that owners have saved, with attractive profits, hundreds of tons of coal ordinarily consigned by other processes to waste piles.

Whether you are considering a new plant, expansion, revamping of flow sheet or the salvaging of values from old refuse piles, you will find the SuperDuty to your liking.

For full information, write for Bulletin 119.



CONCENCO FEED DISTRIBUTOR

The Concenco Revolving Feed Distributor is a heavily fabricated all steel machine with motor drive requiring 1 H. P. or less in operation. It effectively provides a splitting of feed into any desired number of equal portions, feeding any number of circuits or machines in battery for greater overall efficiency. Unexcelled for feeding coal washing tables.



★ The ORIGINAL Deister Company ★ Inc. 1906

ritating dusts, the company says. Interchangeable frames and windows permit use of respirator, and cotton-duck hood has adjustable neck and underarm straps to insure close fit. Windows are .040-in non-flammable acetate that may be replaced without removing frame.—Willson Products, Inc., Reading, Pa.

(20) **HEAT-RESISTANT PAINT**, Speco "M" aluminum, for temperatures from 200 to 700 deg F, is suitable for interior and exterior use and brush or spray application. Also resistant to fumes, moisture, mild acids and alkalis, the paint sets in 3 hr and dries in 18 hr, the maker says. Normal coverage is 560 sq ft per gal. Available in 1-, 5- or 55-gal containers.—Speco, Inc., Cleveland 9, Ohio.

(21) **ANTI-RUST PAINT**, PCA-100, a new penetrating and sealing paint, can be applied to new or rusted surfaces to prevent rust or stop rust action, the manufacturer advises. PCA-100 is available in black only and should be used as a finish coat. PCA-101, a clear paint which is equally effective against rust, may be covered with standard paint of any color.—Paint Corporation of America, Cleveland 14, Ohio.

(22) **COLLAPSIBLE BOX**, with 5,000-lb capacity, can be dumped by lift truck with revolving apron. Erectible in 20 sec, the "Phil-Box" folds down to a collapsed height of less than 10 in to save storage room. Guide holes on all four sides provide openings for fork-lift prongs. Safety catch and lock prevent untimely collapse.—Phillips Mine & Mill Supply Co., Pittsburgh 3, Pa.

(23) **FOG GUN** fits ordinary garden hose to provide fine spray for fighting fires, settling dust, washing windows, floors or vehicles and for spraying lubricants and other liquids. Gun is available separately or in a kit which includes adapters for hydraulic, flat or mist sprays.—Bete Fog Nozzle, Inc., Greenfield, Mass.

(24) **PLASTIC WELDING-HELMET WINDOW**, made of thermosetting plastic, is clear, hard and almost colorless with a surface comparable in smoothness, lustre and chemical resistance to polished plate glass. The new window is more resistant to pitting than glass, will not discolor under ordinary welding conditions, will not peel, blister, crack or shrink, and gives up to 1,000 hr of service, according to the manufacturer.—American Optical Co., Southbridge, Mass.

(25) **RUBBER-FRAME GOGGLE**, Model 701, is constructed without ventilating slots to provide a gas-tight seal for gas, smoke and fume hazards. Headband enters slots in outer frame, and screw heads are stainless steel. New goggles may be obtained in combination with R-2,000 or R-5,000 respirators.—American Optical Co., Southbridge, Mass.

WEMCO MOBIL-MILLS



**produce
clean coal
that sells!**

7 REASONS WHY WEMCO MOBIL-MILLS HAVE OUTSOLD ALL OTHER HEAVY-MEDIA SEPARATION PLANTS COMBINED:

- Prefabricated
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- Fast installation
- Compact design
- Low operating cost
- Clean, sharp separation
- Installed for you

WRITE TODAY for new bulletin giving complete information on how a Mobil-Mill can greatly improve the price and saleability of your coal.

Your coal can sell to a steady market at top profits. Mobil-Mill precision cleaning by Heavy-Media Separation permits selling to a demand market — the steady market for clean coal. Of many operators who have installed Wemco Mobil-Mills to swing sales upward and change losses to profits, an Illinois coal producer is a typical case.

Nearly out of business because of a rapidly diminishing demand for unwashed coal, this Illinois operator installed a #3C Wemco Mobil-Mill to wash approximately 60 TPH of 4" x 1/2" coal. Results were impressive. 91% of his total feed was recovered as readily saleable clean coal with ash content reduced from 13% to 9.1% (6% inherent ash). 99 1/2% of the Mobil-Mill washed coal reported as true float (by heavy liquid test), and media consumption was only 0.67 lbs. per ton of H.M.S. feed. As a result, this operator now produces a product which more than meets his market demands.

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(10) PNEUMATIC VIBRATOR—In new applications in conveying, these vibrators have used sand-vibrating freely from flows largest, setting mixes in concrete. Most vibrators and designs tested, are available in five sizes with output from 14 to 14 1/2 cu. ft. per hour. Operating at 50 psi pressure, the new Series 77 vibrators deliver from 2,500 to 1,000 blows per min. depending on motor. Features: Designed for single or double-end mounting, the units permit vibration to flow with flow or at 90 deg. to direction of flow. Air consumption is from 4 to 25 cfm.—**SPC, Inc., Cleveland, Ohio**

(11) MACHINERY VIBRATOR—Features a new prebalanced, self-aligning thrust bearing at the front of the sliding jaw, which permits wear and clearance adjustment. Camshaft drive, with jaw widths from 2 to 8 in., can be pulled up tighter and held more securely with less pressure than required by ordinary rings. The company states: One-piece handle, replaceable jaw faces and patented adjustable castings and other features.—**Cleveland Vice & Mfg. Co., Cleveland 4, Ohio**

(12) RESILIENT RING MOTOR—Designed to produce torque pulsations of single-phase motors that being transmitted to the driven machine, are available at ratings of from 1/2 to 5 hp. An addition to General Electric's Tachaflex line, the new motor are equipped with long-life laminated ball bearings. Except for the 1-hp size, which has three only, the motor operate on 115/230-volt power supply.—**General Electric Corp., Schenectady, N. Y.**

(13) VOLTAGE REGULATOR—Features 10-step, feed-back voltage regulator (FBL-10) for control and adjustment. With or without a provision plus or minus 10% regulation in 1/2% steps, available in ratings from 12.5 to 750 kw, single phase, and at standard voltages of 110/220 v or 480 v, the new regulator is equipped with an oil-immersed tap changer with direct motor drive and a reversing switch to provide 10% regulation on either side of the regulator control. The FBL-10 is equipped with 120-wattage control relay, voltage regulator relay and warning relay in a compact, low-cost type flange chassis. The unit may be quickly moved or replaced by a standard, separate mechanism and maintains line-regulation provides a full range of load-regulation, the company says.—**Westinghouse Electric Corp., Pittsburgh 30, Pa.**

(14) RAIL TANKY DISPENSER—Expensive, accurate, containing 1,000-ounce-weight salt capacity, is used to insure a supply of needed tablets for the life of the year. Made of sheet plexiglas, the dispenser is equipped with a temperature compensation. The unit is described when empty.—**Chemical Safety Equipment Co., Chicago 20, Ill.**

Y-4 would like more information . . .

Please send me catalog or further information about the items from the Equipment News Section whose numbers are listed (August, 1951)

1	6	11	16	21	26	31	36	41	46	51
2	7	12	17	22	27	32	37	42	47	
3	8	13	18	23	28	33	38	43	48	
4	9	14	19	24	29	34	39	44	49	
5	10	15	20	25	30	35	40	45	50	

In addition, please send me data on their OTHER products advertising in this issue (give name and page number)

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TO GET MORE INFORMATION on products and bulletins mentioned in this Equipment News Section or for data on any product advertised in this issue. Circle item numbers, tear out and mail.

EQUIPMENT BULLETINS AVAILABLE

(15) TIRE CONSERVATION—New 8-p. booklet, "9 Ways to Get More Miles Out of Your Tires," published by the U. S. Goodrich Co. Akron, Ohio, offers useful hints and suggestions for getting maximum tire service, including proper selection for the job, correct inflation, correct loading and load distribution, avoidance of mechanical defects, proper care of correct regular rotation of tires, proper handling and storage of tires, savings through recycling and retreading and proper driving habits. A truck tire load and inflation table and a dual spacing table are among its features.

(16) CHAIN DRIVERS—Bulletin 614 entitled "Installation, Operation and Maintenance of Chain Drives and Conveyors" has been published by Chain Belt for chain drive design, installation, maintenance or operate chain drives and conveyors. Emphasizing how to get the most service from sprocket chains, the booklet shows graphically the correct and incorrect ways of solving chain installation, operation and maintenance problems, and out-

lines proper methods of inspection, lubrication and adjustment. Available from Chain Belt Co., Cleveland 12.

(17) WINDSHIELD AND GROUND GLASS—Bulletin 615, covering 201 craft, also covers Windshield Parts, Inc., Cleveland 12, covers the SHIELD-GLASS line of wind equipment, including its hood clamp, body top, ground clamp, jaw clamp, fuselage tape and pinch bolts, with design and operating characteristics described and illustrated.

(18) WIRE ROPE—New 22-p. wire rope information book entitled "The Right Rope for the Job," lists an extensive range of wire-rope applications on various sizes of equipment, illustrating the particular types of rope recommended for each service, having described the sheaves, drums and other units are included.—**American Steel & Wire Co., Cleveland 12**

(19) CARBON BATTERIES FOR ELECTRIC EQUIPMENT—Bulletin 616-617, described and illustrates the characteristics, construction, the design, application and maintenance of carbon batteries and includes a section on graph-thermography. Designed to meet more in making proper brush applications, the two bulletins stress studies data on types of brushes, characteristics of brush grades, brushgrade recommendations, mechanical design of brushes and tips on brush replacement. Avail-

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also from General Electric Co., Schenectady 4, N.Y.

(36) **URAL DEWATERING**—Bulletin offers detailed design, operating and application data on the new Hercules T-24 drier featuring a top-feed reservoir, operation with high-frequency vibration and discharge under vacuum.

(37) **ALLOY PRODUCTS**—Bulletin lists 178 different USSC steels and high-alloy products on special equipment, provided by our alloy, stainless, and heat-treated characteristics. Limited specification sheets for various alloys, ranges, values, types and tubing are provided with 10 pp devoted to weight, area, hardness, and standard construction tables. The 20-p booklet is available from Electric Steel Foundry Co., Portland 12, Ore.

(38) **DIAPHRAGM PUMP**—Catalog CH-212-A from the International Harvester Co., Chicago 1, contains detailed operating and design data and specifications on the IH TD-9 diaphragm master developing 40.5 drawbar horsepower. Job applications are shown, along with extensive information on construction and performance features.

(39) **HEAVY DUTY PIPE COUPLING**—Bulletin from Naylor Pipe Co., Chicago 12, describes the heavy-duty White-Lock coupling for use on an lightweight pipe in sizes from 4 to 26 in. Space and simplicity of construction features and a feature is the only tool required to connect or disconnect the one-piece positive-type coupling, the maker says.

(40) **PUMP MOTORS**—E.M. Specification 22, available from the Electric Machinery Mfg. Co., Minneapolis 12, deals with large pumps and the

application of AC motors to them. Among the subjects discussed are the new Hercules steam-water pumping project, use of large AC motors with "powerhouse" insulation treatment, and the use of the variable-speed Magnetic Drive in pumping applications.

(41) **DIESEL ENGINES**—New 200 pp. providing operating and construction features of International diesel engines, being distributed by the International Harvester Co., Chicago 1, after 400,000 hours of heavy torque control, all-weather gasoline conversion starting, combustion control, and long life lubrication.

(42) **TRUCK LIFTING GATE**—Bulletin K-51, describing a low-cost, hydraulically operated lifting gate that eliminates the physical labor of lifting loads on or off a truck platform, is available from the Hercules Steel Products Corp., Canton, Ohio. The Hercules Load-N-Gate is available in four sizes to suit small and platform may be "folded" at any desired height to facilitate efficient loading or unloading, it is said.

(43) **BUCKET LOADERS** available in three models, each wheel or crawler-mounted with capacities of 3 cu per minute, are described in Bulletin B-74-77, along with operating and application data and detailed specifications. Offered by the George Haux Mfg. Co., Inc., 116 of Philadelphia Mallion Corp., New York 31.

(44) **AUTOMATIC OILERS**—Bulletin Series 4200 offered by Tracy Ross Mfg. Co., Milwaukee 12, provides operating and installation data on its line of reliable automatic oilers for constant-level, gravity, wick, wet-disk, multiple and large-capacity gravity-feed applications on a wide range of machinery.

(45) **HOSE FITTINGS AND LINE CLAMPS**—Bulletin E-100-104 on the subject Hose Fittings and Line Clamps includes design, performance and application, and is available from Washington Ferry Co., Machinery Corp., Danville, Mass. Another bulletin, specification Sheet E-100-104, plans and details on the Hose Fitting and Line Clamps with detailed specifications and operating data.

(46) **LIGHTWEIGHT STORAGE BATTERIES**—Technical literature 1 and 2 provide detailed design, application and performance data, including characteristic curves, on the Tardex line of 100-watt rechargeable storage batteries, said to be as much as one-fifth the size and one-sixth the weight of average batteries. Available from Tardex Electric Corp., New York 2.

(47) **DIAMOND CORE DRILLS**—Bulletin 71 available from H. J. Longyear Co., Minneapolis, offers specifications and operating data on the Wolverine diamond core drills designed primarily for underground drilling but also applicable to surface drilling. The unit has a capacity of 100 ft, driving a hole 12 in. in diameter, and is available with either electric or air power.

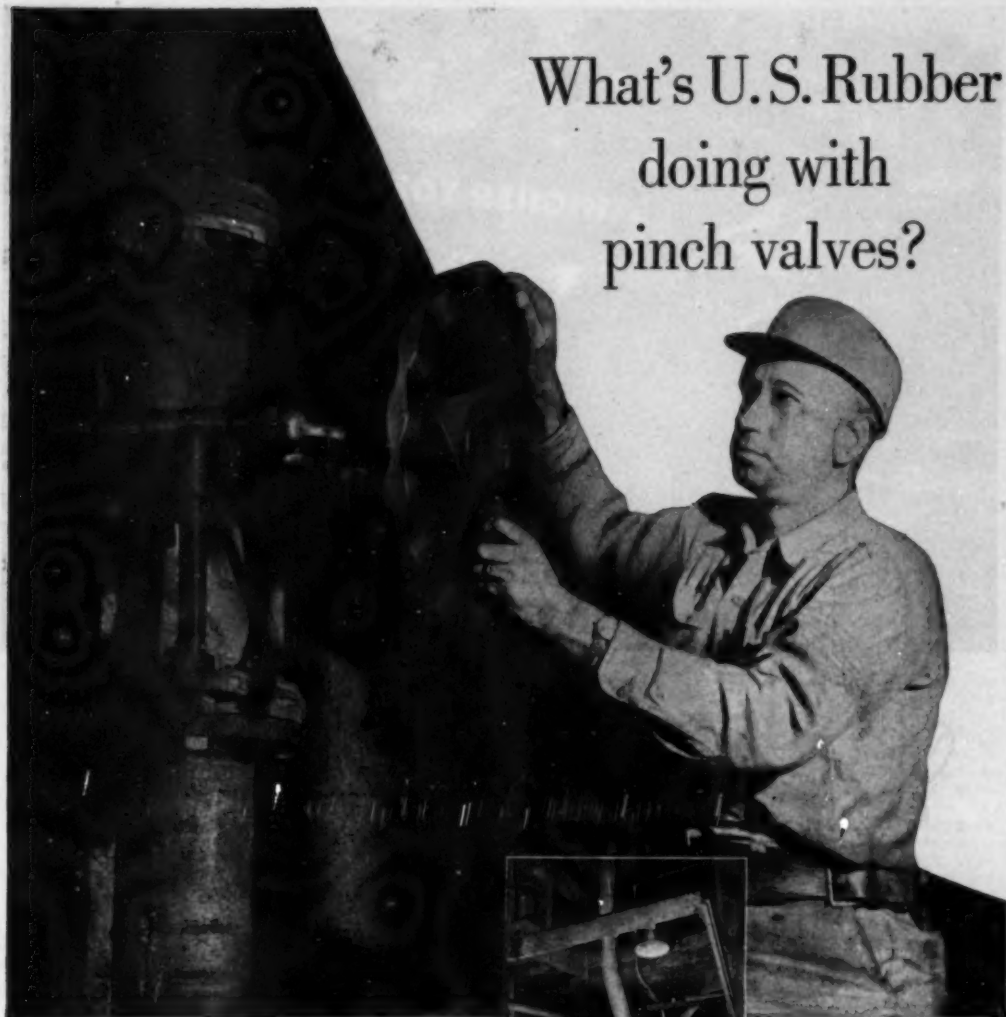
(48) **FLOOR MAINTENANCE**—"How To Rough Spot" a new 16-page 20-p booklet on flooring problems, tells where to look for and how to correct bad floor conditions, how to protect your concrete and wood floors, and contains proper methods for repair, refinishing, and floor care. Available from Standard Co., Philadelphia 24.

(49) **CONSTRUCTION SERVICES**—The new Division plans 500 Planning Time Magazine are designed to help an OPM from the World Co., Westchester 20, N.Y. It offers information on the application of various-time recording to process, measure, compare and other machinery, in the field, in design and operation.

(50) **WATER SOLVENT** for use on ferrous metals and equipment is discussed in a booklet that points out that "Bromsol" works three ways: loosening water and rust, increasing "wetting-out" properties of any solution and working high detergent action for dissolving scale and debris available from Haux Miller Corp., Philadelphia 41.

(51) **TURNTON-CARRERE IN-SERT SYSTEM**—An new bookletized monthly publication called *Site of News* started by Kenneth J. Turner, Latrobe, Pa., features helpful application suggestions on the use of turntable-mounted manholes for the coal industry, petroleum refineries, placed on the maintenance, proper use, time-saving applications and safety of turntable manholes. Request forms can be obtained on request to the company.

What's U.S. Rubber doing with pinch valves?



IN MANY coal preparation plants U.S. Pilot Pinch Valves control the flow of water containing abrasives. In the chemical industry, they handle corrosive mixtures, acids, and solids. They serve the paper industry, the food and beverage industry.

Another "U.S." product invaluable in coal washing is U.S. Pilot Flexible Pipe. The one at right carries up to 10,000 tons of sand a day. Both Pilot Pinch Valves and Flexible Pipe safeguard equipment from mechanical strain caused by vibration, expansion, contraction and "water-hammer."



U.S. PILOT PINCH VALVE being adjusted by coal mine superintendent to control flow in preparation plant of large West Virginia mine. Mechanism is very compactly designed, can be refitted to new pinch valve bodies.

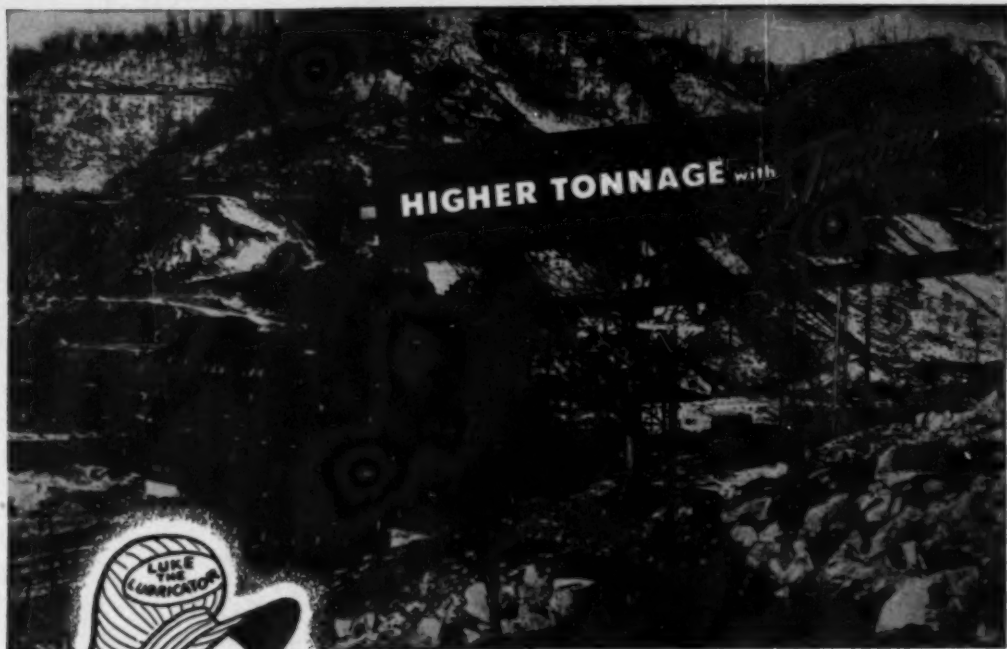
U.S. PILOT FLEXIBLE PIPE conveying sand and water in same preparation plant. Pipe is so flexible no elbows or short connections are needed. This particular pipe has been in service two and one half years so far, replacing a metal pipe which lasted only six months.

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ACI Sees Coal Strong in Second Half

TOTAL BITUMINOUS PRODUCTION in 1951 will be 531,096,000 tons, an increase of 3.7% over 1950, says a forecast by Appalachian Coals, Inc., following an extensive survey of industrial and home markets and a study of the impact of national defense. The forecast was presented at ACI's sales executive meeting June 26.

Following is a brief summary of the forecast:

DEFENSE GOODS—Thus far, stress has been on plant construction rather than production of goods. As production gains in the second half, coal needs will grow.

STEEL AND BY-PRODUCTS—No letup in steel production is in sight through the year, though scrap shortages may block absolute maximum output. The outlook is for successive new records and growing capacity. Coal use by by-product and beehive ovens and steel and rolling mills will be 122,977,000 tons, 10.6% above 1950.

PLANT BUILDING—Automobile makers, instead of converting present plants to war goods, are building new plants. Total industrial space in the Nation by 1953 will nearly double that in 1949 and, if full operations continue, will boost coal use for power, heat and processing.

ELECTRIC UTILITIES—Production of electric energy now is running 13 to 14% above year-ago levels but may flatten out in the second half, ending the year with a 7% increase over the 6,900,000,000 kw-hr weekly output in December, 1950. Power output dropped 5% from March to April while coal use fell 13% but the coal decline is attributable largely to seasonal dumping of natural gas. Low rainfall in the Southeast is bringing in standby steam facilities and the recent oil price rise on the Atlantic Seaboard may bring a further shift to coal unless the railroads obtain a freight-rate increase. Coal use by electric utilities is expected to reach 102,242,000 tons, 15.8% above 1950.

OVERSEAS EXPORTS—This is the brightest spot in the immediate coal-market outlook. Exports in the second half will total 15,000,000 tons, against 13,036,118 in the first half.

CHEMICALS—Growth will continue through the year, with the FRB

index of chemical production rising from 291 in the first quarter to 309 in the last quarter.

TEXTILES—Some upturn is in prospect after July 1, with momentum picking up in the fall at a rate exceeding peak production in February.

RAILROADS—Carloadings in 1951 will be 6.8% above 1950, with much of the upsurge coming in the last quarter. The coal outlook is more favorable in periods of heavy loading. Total coal use by railroads for the year will be about 61,000,000 tons.

LAKE MOVEMENTS—Lake shipments will approximate 47,000,000 tons, about 10% under 1950, because of some increase in rail movements, dockers' fears of season-end inventories next spring, spot boat shortages and other factors.

RETAIL—In the Southeast, though summer bin-filling has not caught on, shipments in the second half will exceed those in the first half. In the North Central area dealers also are expecting bigger sales for the second half. Natural-gas conversions in Ohio, Indiana and Michigan have almost stopped and there are some reconversions to coal. Defense payrolls are expected to boost coal sales in the North Central region. Total retail tonnage in the Nation will be about 86,000,000 tons, with retailers moving more steam coal as subcontractors start up on defense orders.

COMPETING FUELS—Well-head prices for natural gas are rising, a peak of 15.4¢ per 1,000 cu ft being reached in some areas against a 1949 average of 4.5¢ in Texas. Shortages

are developing in some areas because of over-commitments and failure to build expected pipelines. The shortage will be serious for at least the next two seasons. The peak of natural-gas expansion seems to have been reached.

Recent oil-price increases on the Atlantic Seaboard indicate a growing shortage. Recently, surplus producing capacity has been declining and the industry is pushing against refinery-capacity ceiling.

Conn. Court Order Delays Natural Gas Pipeline

The introduction of natural gas into Connecticut appeared to be in for a definite delay last month after Superior Court Judge John T. Cullinan denied the Northeastern Gas Transmission Co. an immediate right-of-way through property in lower Fairfield County for a pipeline.

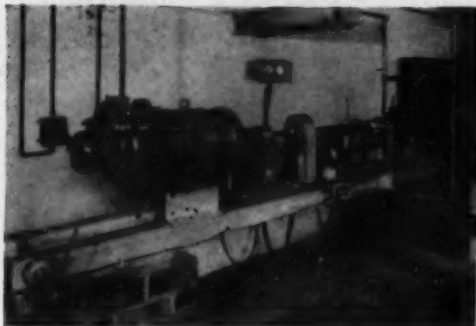
The court rejected the company's argument that an emergency in manufactured gas supply existed in Connecticut and said that natural gas could not be "imported under the guise of 'emergency' when in fact there is no urgency or crisis or public prejudice to be occasioned by temporary delay." Judge Cullinan concluded that the 79 property owners contesting the condemnation proceedings "are entitled to have their legal rights determined before their lands are taken."

Later, on July 23, Secretary of the Interior Oscar L. Chapman told the Gas Industry Advisory Council that the impending limitation order on new natural gas customers (see p 140) would be lifted as soon as enough steel pipe became available to complete gas pipelines.

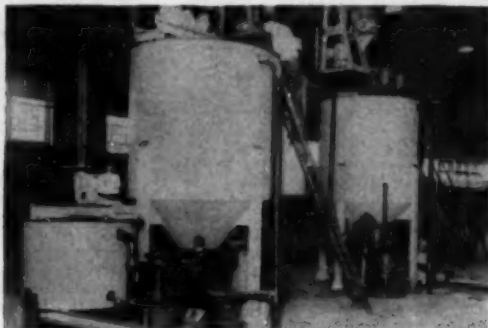
Several days earlier, Secretary Chapman, speaking as Administrator of the Petroleum Administration for Defense, had appealed to a Senate committee for more steel to keep the oil and gas industries going. In a statement adding up to "no steel—no gas," he said that large amounts of steel are needed to complete pipelines under construction for some time and warned against possible shortages of gas in many parts of the country during the coming winter.

Featured in This Section

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BRITISH HOPE FOR DRILLING IMPROVEMENTS from a drill test unit (left) and a drill rig for field experiments. Studies are revealing new facts about torque, thrust and speed of rotation and penetration.



FACTS ABOUT AIR LEAKAGE in drift ventilation are yielded by pipeline installed in laboratory (left). Settling tanks in coal-preparation department aid in the search for a better product.

British Research Seeks Better Methods

THE SEARCH FOR IMPROVED METHODS of mining coal is getting major stress at the National Coal Board's Central Research Establishment, Stoke Orchard, near Cheltenham, England. In addition to studies of mining methods and machines, physicists and chemists also are investigating the physical properties of certain coals.

Following is a brief description of principal projects now under way at the research center:

1. Testing for the best way to mine a seam—Should the coal be mined by a stripper, a coal plow, pneumatic picks, miners' picks or some other means? Getting a quick answer to this question at the start of mining will avert the need of changing the equipment later.

2. Dust-control and dust-measurement methods—A "comparator" measures airborne dust without laboratory analysis. Dust-laden air is made to impinge upon filter paper, which collects the dust. The resulting stain is compared with a discoloration chart

by means of a photoelectric densitometer.

3. Speed in sampling and analyzing methane—One approach is a metal cylinder and hand pump, air being pumped into the cylinder at pressure up to 10 atmospheres. The cylinder is clipped into an adapter on the Haldane apparatus and air is released through a reduction valve. Pressure forces the air through without need for mercury-filled balance jars, thus almost halving analysis time.

In another study, infrared light is used. Absorption of the infrared radiation depends upon the proportion of methane in the samples under test. The temperature increase is read on a scale graduated in percentages of methane. A special instrument gives a reading in only 20 sec.

4. Rotary drilling in the field—A 5-hp drifter mounted on a stand is equipped with gages to measure thrust, torque and speed of rotation and penetration. In some instances, trebling pressure has increased penetration 10 or 12 times. Investigations are being made that may lead to re-

designing certain drill rods and increasing rotation speeds.

5. Drift ventilation—Ways are being sought to reduce leakage in pipeline joints and in damaged lengths of pipe.

6. Warning of roof breaks—A sonic method to give warning of roof falls is being studied, using sound waves instead of radio waves.

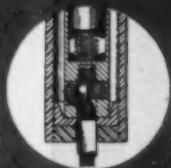
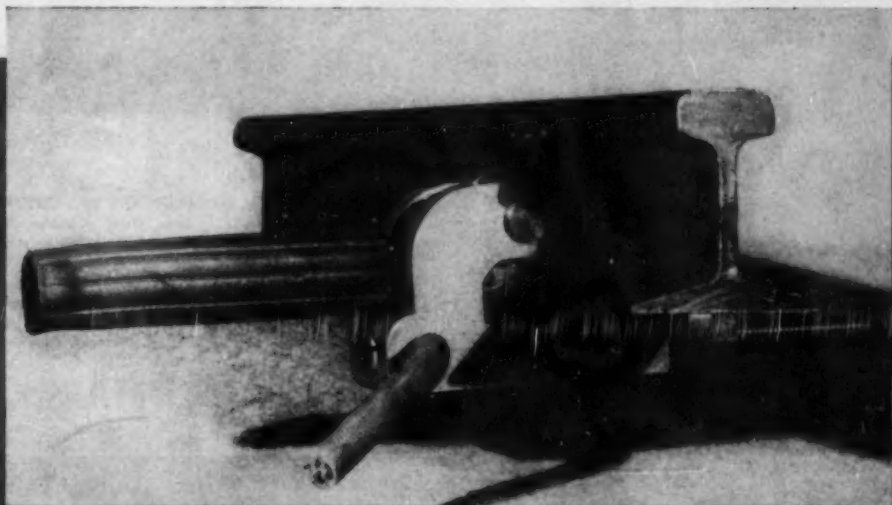
7. Reducing worker fatigue—A large hut where face conditions are simulated is being used to find the easiest methods of doing jobs. The aim is to design machines to fit men.

Much of the apparatus at the research center is of semi-commercial size and can be readily adapted to actual mining conditions. Electric power at 3,300 v for the establishment is transformed to the voltages needed for the various tests. Mercury-arc rectifiers provide dc power where needed and compressed air is generated on the institute's property. Process steam comes from a creosote-fired flash boiler. Twin boilers provide heat for the laboratory and other structures.

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INDUSTRY MEETING—A Special Coal Age Staff-Written Report



AUGER MINING AND COST CUTTING—A. R. Matthews (left), Clinchfield Coal Corp.; D. M. Bondurant, West Virginia University; John T. Parker, Inland Steel Co.; H. J. Douglas, secretary, Chamber of Commerce, Middlesboro, Ky.; and M. A. Evans, coal operator.

MULTI-SEAM MINING AND GERMAN METHODS—R. W. Storey (left), Consolidation Coal Co. (Ky.); Earl B. Norris, Virginia Polytechnic Institute; James B. Benson, U. S. Bureau of Mines; and Charles T. Holland, Virginia Polytechnic Institute.



FROTH FLOTATION AND GAS EXPLORATION—T. J. Jones (left), Kentucky state geologist; F. M. Morris, Virginia Polytechnic Institute; R. M. Allen, French Coal Co.; M. V. Corriveau, Virginia Polytechnic Institute; P. H. Price, West Virginia state geologist; E. R. Carris, Roberts & Schaefer Co.; and R. H. Wilpolt, chief geologist, Clinchfield Coal Corp.

ANNUAL BANQUET—E. B. Norris (left), Virginia Polytechnic Institute; M. H. Forester, Pittsburgh Consolidation Coal Co.; H. L. Donovan, University of Kentucky; E. R. Price, Inland Steel Co.; C. E. Lawall, Chesapeake & Ohio Ry.; John T. Parker, Inland Steel Co.

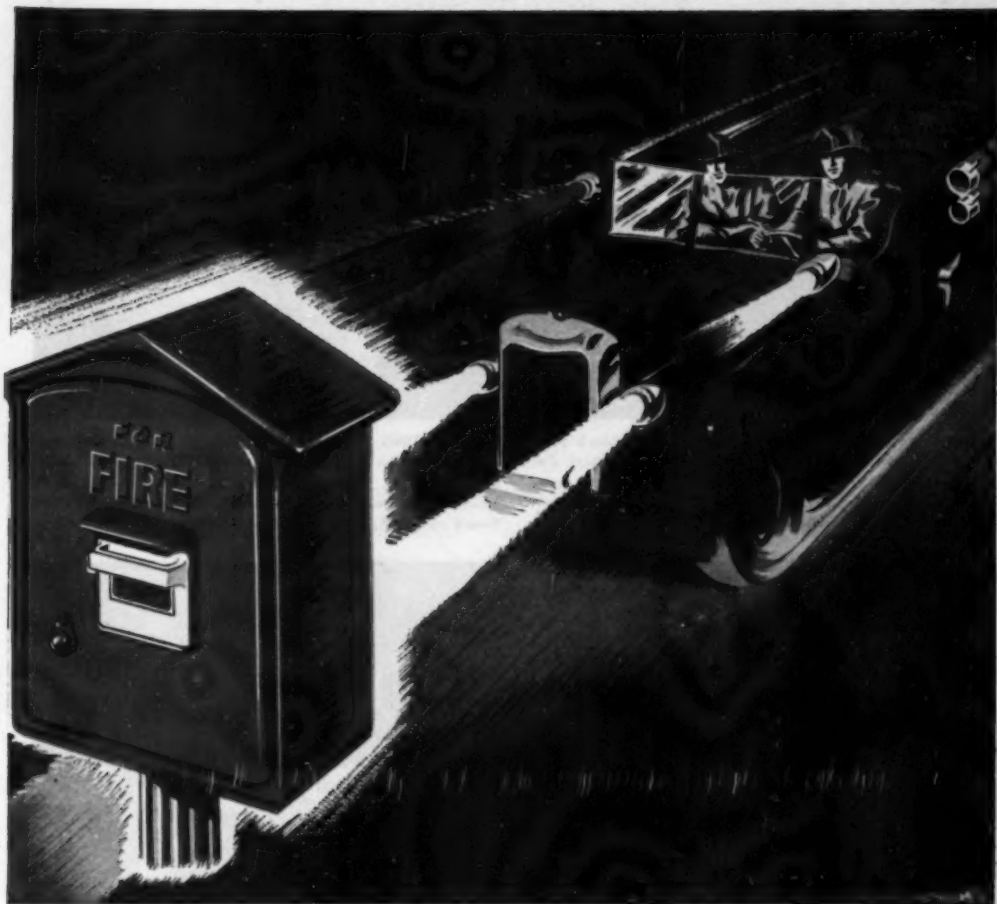


Central Appalachian AIME Scans Mining

Two-Day Session Covers Preparation, Cost-Cutting, Highwall Auger Mining, Multiple-Seam Operation and European Methods—Discussion of Operating and Service Costs Features Two-Day Meeting in Kentucky

FROTH FLOTATION OF FINE COAL, large augers for highwall mining, lower costs to meet coal's competition, mining contiguous seams, and German coal mining were subjects of direct interest to coal-mining men at the Middlesboro, Ky., meeting of the

(Continued on page 173)



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INDUSTRY MEETING—A Special Coal Age Staff-Written Report



CLEANING FINE COAL, SILICOSIS—Wm. C. McCulloch (left) Roberts & Schaefer Co.; Byron M. Bird, technical consultant, Jeffrey Mfg. Co.; C. R. Bourland, vice president in charge of operations, The New River Co., and president of the institute; and William F. Eckert, Pickands-Mather Co.



ROOF BOLTING, PRIORITIES, CONTINUOUS MINING—Seated: Arch J. Alexander (left), chief, West Virginia Department of Mines; and Charles W. Connor, administrator, DSFA. Standing: C. E. Hough (left) vice president, Imperial Smokeless Coal Co.; and Gerald von Stroh, director, BCR Mining Development Committee.



DIESEL LOCOMOTIVES, BRIDGE CONVEYORS, ROOF BOLTING, DUST CONTROL—H. A. Quenon (left), Eastern Gas & Fuel Associates; Floyd G. Anderson, U.S. Bureau of Mines; R. H. Magee, vice president, National Mine Service Co.; and A. B. Crichton Jr., vice president, Johnstown Coal & Coke Co.



AT THE LUNCHEON: L. A. Crittenton, National Association of Foremen, speaking. Speaker's table: Charles W. Connor (left), DSFA; R. C. Luther, Peerless Coal & Coke Co.; R. G. Lazelle, Island Creek Coal Co.; C. R. Bourland, The New River Co.; and G. R. Spindler, West Virginia University, institute secretary-treasurer.

W. Va. Group Sifts Methods, Problems

FINE COAL CLEANING, roof bolting, room transportation, material priorities, diesel locomotives, mining developments by Bituminous Coal Research, Inc., and silicosis were discussed at the summer meeting of the West Virginia Coal Mining Institute, Bluefield, June 22-23. The president, C. R. Bourland, vice president in charge of operations, The New River Co., called the meeting to order and acted as chairman of the first technical session and as toastmaster at the banquet, at which former U. S.

Senator Rush D. Holt was the speaker. L. A. Crittenton, National Association of Foremen, spoke at a luncheon at which R. G. Lazelle, assistant to the president, Island Creek Coal Co., presided. Registration for the meeting was 170.

Wet cleaning of bituminous coal was discussed at length by Byron M. Bird, technical consultant, Jeffrey Mfg. Co. Mr. Bird concentrated on the actual separation of coal from refuse (*Coal Age*, June, p. 110) and did not go into dewatering. Mr. Bird's

summary indicates the ground covered by the paper:

1. The single most important item to watch in a wet-cleaning plant for fine coal is thorough wetting of the raw coal. No wet process will wash dry coal efficiently.

2. The great bulk of fine-coal cleaning problems are simple and can be handled by any of the conventional processes. The choice of process and of flowsheet then depends upon first

(Continued on page 176)

We Mobilize for Freedom

CONTROLS . . . A Two-Edged Sword

It may seem dangerously premature to talk about getting rid of emergency government controls while all-out war is still an imminent possibility.

But success in this strange struggle for our freedom into which the Russian Communists have plunged us requires that we:

1. Maintain a whole battery of controls designed to speed defense production and curb inflation, and at the same time
2. Work to end the controls at the earliest possible moment.

Here is the reason why this editorial—fourth in a special series on mobilization for defense—is devoted to the need for a speedy release from controls.

If the Russian Communists can force us to maintain indefinitely the present system of government controls, they will have won a tremendous victory. They will have saddled us with a system of collectivism which, over a period of years, would be fairly certain death to freedom of business enterprise.

Make no mistake about it. This is not an argument against emergency controls. We need controls now to break a right of way for

our mobilization program through the business boom. Indeed, the third editorial in this special series was titled "Why Controls Are Necessary." It stressed both the need for controls and the need for positive cooperation to make them work.

Controls Can Undermine Our Economy

But these controls surely chisel at the foundation of our normal economic system. So long as we have them, many if not most key business decisions will be made in Washington bureaus rather than in the free market place. For example, the *National Production Authority* administers a *Controlled Materials Plan* (italics ours) which directs the flow of basic metals, and decides who can use them for what purposes.

Happily, the people who operate these controls are not using the methods of a secret police state.

Even more happily, most of the leaders who have been drafted to manage the controls are not in love with their jobs. They are doing their best in the thankless task of making controls work. They recognize the danger of chronic controls.

But the fact remains that our economy is

operating under arrangements which carry it a long way toward the pattern of centralized control the Russians would inflict on the world.

The Wilson Plan

A plan for getting rid of these controls has already been developed. It was put together by our Director of Mobilization, Charles E. Wilson — while he was working day and night to set up the necessary emergency controls.

The Wilson Plan — if we escape all-out war — will strengthen our defenses and our economy. By 1953, it calls for:

1. Providing the weapons to equip an armed force of 3½ to 4 million, together with a supply of weapons for our allies.
2. Building a stockpile of weapons which, with current production, would be sufficient to carry on an all-out war for a year.
3. Building the manufacturing capacity by which we could rapidly expand our production of weapons if all-out war should come.
4. Increasing the productive capacity of industry enough to resume the expansion of our civilian economy.

With these jobs done our economy would be big enough and strong enough to meet both civilian and military requirements. And the government controls needed for mobilization could be speedily dropped.

Call for Sacrifice

The Wilson Plan requires a major effort — it means spending more than \$50 billion a year for mobilization. That is almost 20 percent of our total production. And this cannot be done without sacrifice. For a time, particularly in the next year, living standards will drop.

But the sacrifice required is amazingly small. At the peak of the defense effort, civilians will still have available to meet their needs about as much as they did in any year before 1948.

To make the Wilson Plan succeed we must curb inflation. A second year of inflation such as that which we have had since the Korean war started would multiply disastrously the costs of our defense program. One key part of a successful program to curb inflationary pressure, which soon will be building up again, is a pay-as-we-go tax program. The second editorial in this series urged that we do our utmost to pay as we go.

We Cannot Out-Control the Communists

But, above all, to make the Wilson Plan work we must keep our sights set on the crucial importance of increased production. Our problem is to increase our capacity to produce so that we can carry both a major military program and an expanding civilian economy for as many years — General Bradley thinks it might be fifteen or twenty — as the menace of Russian Communist aggression persists.

If we do not produce enough to do this double job, we shall be confronted with the prospect of having to live indefinitely under government controls of the sort that have been set up since the start of the Korean war. That would be delightful to the Russian Communists. It would go far toward making over our economy on the Moscow model.

Even if we wanted to, we never could hope to out-control the Russians. They are miles ahead of us in that line. But we can out-produce them, by a tremendous margin. By doing that we shall travel the surest road to victory.

McGraw-Hill Publishing Company, Inc.

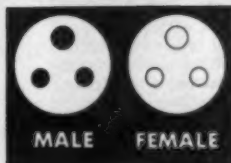
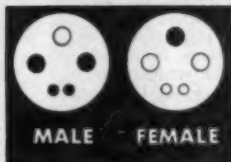
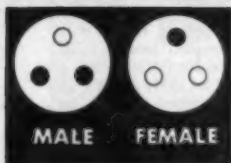
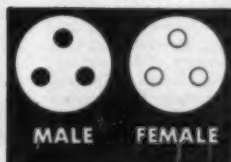
JOY S.P.B.* CONNECTORS

*JOY Straight Pin Bigun (S.P.B.) Connectors are built for rough everyday service. Equipped with rust-proof threaded metal coupling (see cut-away sketch) and the famous JOY two-way water seal, they can't be surpassed for performance, safety and durability . . . and because they're molded to cable as one-piece Neoprene units, they're shatter-proof, wear-resistant and highly impervious to the deteriorating effects of moisture, grime or oils. Through them power cable can be sectionalized into easily handled lengths that facilitate rapid replacements of damaged sections.

Available for A.C. or D.C. operation in current capacities to match job requirements. Choice of one through four conductors with choice of contact arrangements illustrated and described below.

Choice of 4 Contact Styles

Rated at 600 volts maximum



STANDARD PIN PLACEMENT

Available in single conductor design for wire sizes 14 through 1000 MCM . . . and in two, three or four conductor styles for wire sizes 14 through 4/0.

REVERSED PIN PLACEMENT

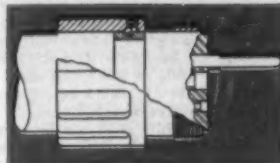
All contacts same size, however, one contact reversed in Male and Female plugs for grounding and polarization. Available in three or four conductor styles for wire sizes 12 through 250 MCM.

PILOT PIN DESIGN

Same number of conductors and wire sizes as listed above for reversed pin placement series, however, have two additional small "pilot-control" contacts. Supplied with these contacts shunted or carried through cable on two #10 wires.

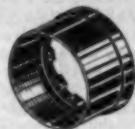
ENLARGED PIN DESIGN

Supplied with one larger contact on Male and Female plugs for grounding and polarization. Available in three or four conductor styles for wire sizes 12 through 250 MCM.



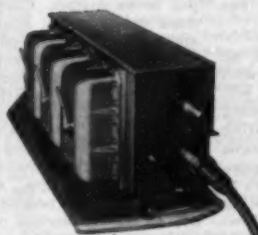
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No. PGCK—PERMISSIBLE STYLE
THREE OUTLET S. C. C. ILLUSTRATED

Ideal for all mechanized mining power transmission systems, Joy SCC's are supplied with 1, 2, 3 or 4 outlets in A.C. or D.C. current ratings to match any need. Fully protect personnel and equipment; permit power delivery through minimum lengths of sectionalized cable. Available in two styles (Permissible and Dust Resistant) both equipped with fast-acting circuit breakers. No fuses, tools or extra parts required to restore power after correcting a fault in cable. Supplied with or without pilot control circuits.



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on JOY Cable Vulcanizers, too.

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MATERIALS, WAGES, PRICES IN THE SPOTLIGHT—G. Don Sullivan (left), special assistant to DSF administrator; C. W. Connor, DSF administrator; R. S. Walker, Bradford Coal Co.; S. W. B. Wood, Department of Labor; and G. A. Lamb, Manager of Business Service, Pittsburgh Consolidation Coal Co.

Mineral Producers Study Coal and Defense

RESPONSIBILITIES and operating policies of the Defense Solid Fuels Administration, pitfalls to be avoided in adjusting employees' wages and the basic principles underlying the bituminous-coal price schedule were major subjects at the 8th annual meeting of the Mineral Producers' Association, Pittsburgh, Pa., June 28.

Speakers at the afternoon session, which followed a morning meeting of the association's directors and a business-session luncheon, were C. W. Connor, administrator, Defense Solid Fuels Administration, Washington, D. C.; Stanton W. B. Wood, field office manager, wage and hour and public contracts division, U. S. Department of Labor, Pittsburgh, Pa.; and George A. Lamb, manager of business surveys, Pittsburgh Consolidation Coal Co., Pittsburgh. G. Don Sullivan, special assistant to the administrator, DSFA, conducted a discussion of Mr. Connor's remarks. R. S. Walker, association vice president, and president, Bradford Coal Co., Bigler, Pa., was chairman of the meeting.

The coal industry, along with all others, faces numerous problems with regard to materials, supplies and priorities, Mr. Connor said, in outlining the activities of DSFA in alleviating these problems as much as possible for coal and coke producers. At present, DSFA is making every effort to assist individual operators in locating vital supplies, Mr. Connor stated. However, under present procedures, it is the responsibility of the individual to make every effort to locate such supplies before requesting the assistance of DSFA in obtaining a National Production Authority (NPA) directive for spot assistance.

Pointing out that this method of operation is a necessary stop-gap, Mr.

Connor added that NPA July 1 would institute a controlled materials plan (CMP), designed to facilitate equitable distribution of available supplies and materials while primarily promoting the fulfillment of defense needs. NPA regulation CMP-5 outlines procedures to be followed, and DSFA will take steps to keep the solid-fuels industries informed of developments, Mr. Connor declared.

While it is the intention of DSFA officials to limit as much as possible the administrative load on coal producers, Mr. Connor said, the agency can only act on the basis of the information available to it. It may be necessary to require some reports from operators when surveys of the industry are needed to promote mobilization.

Looking ahead, Mr. Connor declared: "I believe that in the next decade the solid-fuels industry will be called upon to make one of the most dramatic efforts to expand output in its history. Coal remains the main source of our heat and energy, and the defense-inspired expansion of our entire industrial economy will undoubtedly create new and rapidly rising demands for solid fuels."

Wage and salary stabilization is but another weapon in the fight on inflation, which is the current major problem confronting America, Mr. Wood declared, in reminding that while 8% of our production now goes for military needs, the bite will soon rise to 20%. Inflationary pressure will increase as more people with more money bid for the dwindling supply of consumer goods. Also, in the absence of stabilized wages, employers would be forced to bid for employees, thus adding to the evil.

Pointing out some of the drastic

penalties that might be applied to employers who grant unauthorized increases, Mr. Wood suggested that operators take advantage of the advisory services of Department of Labor field offices to be certain that wage-adjustment plans are in accord with directives of the Wage Stabilization Board.

Outlining the history of price fluctuations from the end of World War II until bituminous-coal price schedules were adopted by the Office of Price Stabilization early in 1951, Mr. Lamb declared that the prices reflect the best available experience within the industry and that coal operators, by their suggestions and willingness to provide necessary information, greatly helped the defense effort. A staff of three government employees assisted by expert consultants from the industry prepared the schedules in the shortest possible time, Mr. Lamb said.

Present schedules are designed to provide flexibility for changing market conditions, Mr. Lamb pointed out, in showing how the schedules were prepared to control prices effectively in the best interests of national defense without attempting to control profits. Emphasis on limiting profits would defeat efforts to increase productivity, and increased productivity is the best anti-inflation weapon, Mr. Lamb explained. With prices fixed operators can increase profits by becoming more efficient. Thus controls, while never painless, do not stifle incentive.

At the evening banquet, which closed the proceedings, Col. Jack Major, humorist, Paducah, Ky., was principal speaker. R. R. Bowie, president of the association and president, Bowie Coal Co., was chairman, and Alan R. Davidson, president, Twin River Co., was toastmaster.

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• McCarthy Self-Propelled Horizontal Blast Hole Drills get in and out of tight quarters quickly; adjust on four individual leveling jacks for proper drilling heights. Excellent for low level work.



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• If you haven't already seen a McCarthy at work, we suggest you see one quick!

These rugged, powerful units have gained universal acceptance as the most efficient machines ever made for drilling blast holes. Furnished with gasoline, electric or diesel power.

Extra heavy construction relieves you of maintenance troubles. They're versatile, fast, economical machines capable of 50% more productive service than any drill you might now be using!

Write Salem Tool today for full facts. Also ask about McCarthy Coal Recovery Drills—the machine that's being acclaimed in so many trade journals for its remarkable ability to reduce mining costs.

DRILLING EQUIPMENT SINCE 1901



THE SALEM TOOL CO.

Personal Notes

Pittsburgh Division, Pittsburgh Consolidation Coal Co., Library, Pa., recently announced the following promotions:

John Ravas, formerly superintendent, Renton No. 6 mine, has been made division superintendent. **Richard Malone**, mine foreman at Renton No. 6, has replaced Mr. Ravas as superintendent.

William Wilson, formerly superintendent, Westland mine, has been promoted to division superintendent. **John Rozance**, mine foreman at Westland, has moved up into Mr. Wilson's former position.

Clarence M. Hays has been made mining engineer of the Pittsburgh Division. Prior to this promotion, Mr. Hays was division engineer of the Renton Division.

J. E. Breth has been named chief engineer, coal mines, Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.

Peabody Coal Co., Chicago, has announced the following appointments:

H. L. Johnson, former superintendent, Mine 43, has been made company safety director. Mr. Johnson has been with Peabody since 1923.

Dick Griffith, superintendent, recently transferred from Mine 47 to Mine 43. He first joined the company as a trapper 21 yr. ago.

C. C. Conway, formerly chief electrical engineer, The Consolidated Coal Co., Johnston City, Ill., has been appointed chief electrical engineer for Peabody.

Edward G. Fox, president, Philadelphia & Reading Coal & Iron Co., has been named by Pennsylvania Governor John S. Fine to the Anthracite Production Control Committee succeeding the late Ralph E. Taggart.

Several appointments in the Coal Div., Eastern Gas & Fuel Associates, recently were announced, as follows:

John S. Wells, formerly superintendent, Wharton No. 1 plant, has been promoted to general superintendent, Wharton Nos. 1 and 2 operations, Barrett, W. Va.

G. D. Holmes, general mine foreman, Powellton No. 3 Eagle mine, has been named general safety inspector for Kopperston Nos. 1 and 2 mines, Wharton Nos. 1 and 2 mines, and the Weeksby, Ky., mine.

C. K. Parker, formerly general safety inspector for Eccles and Kopperston Nos. 1 and 2 mines, has been assigned to Helen No. 9 and Stotesbury No. 11 mines. He will retain Eccles Nos. 5 and 6 mines.

William Laird, formerly resident engineer, Kopperston, has been promoted to superintendent, Wharton No. 1 mine.

Robert Thomas, assistant resident engineer, Powellton No. 3 mine, has been promoted to resident engineer succeeding Mr. Laird.

Norman C. Prudent has resigned as superintendent of the Henderson Run mine of the Jefferson Coal Co., Piney Fork, Ohio, to take charge of a new potash mine being opened near Carlsbad, N. M.

A. L. Lynn, vice president, Island Creek Coal Co., Huntington, W. Va., has been named chairman, Natural Resources Committee U. S. Chamber of Commerce, for the coming year. He is a director of the Chamber.

Obituaries

John George Cline, 50, superintendent of maintenance, Valley Camp Coal Co., Ward, W. Va., died July 6 at Virginia Beach, Va., after a brief illness.

Edison R. Lynch, 61, former general manager, Gulf Smokeless Coal Co., Mullens, W. Va., died July 8 at a hospital in Beckley. Mr. Lynch retired 3 yr. ago.

William W. Reddow, 50, vice president and general manager, Logan County Coal Corp., Amherst Coal Co., and Hatfield-Campbell Creek Coal Co., died suddenly June 28 at Charleston, W. Va. He had been with the Amherst and Logan organizations since 1911 and with the Hatfield-Campbell Creek company in more recent years. His home was at Slagle, Logan County, W. Va.

Rush S. Adams, 65, production manager, Clinchfield Coal Corp., for 41 yr., died July 5 at his home in Dante, Va.

Noah Bentley, 78, Neon, Ky., died in the hospital at Jenkins, Ky., July 6 after a brief illness. He had been an engineer for Consolidation Coal Co. (Ky.) for 40 yr.

Jack O'Rourke, 76, former mine manager, New Orient mine, Chicago, Wilmington & Franklin Coal Co., Benton, Ill., died June 29 in Springfield, Ill., after a 10-day illness. He had retired in 1938.

New Mine Developments

Kelly-Hatfield Land Corp. has purchased over 6,000 acres of coal land on Spruce Fork of Little Coal River from Boone County Coal Corp. and has leased the tract to a coal-producing firm at Sharples, W. Va. Sale price is reported to be in the neighborhood of \$1,000,000.

L. S. Barnett, Equality, Ill., has opened a 400-tpd strip mine in Saline County west of the Gallatin County line to provide coal from the No. 5 seam for the TVA plant at Johnsonville, Tenn. Production is expected to rise to 1,000 tpd in the near future. The coal is trucked to the loading dock at Old Shawneetown, Ill.

Bellingham Coal Mines, Inc., Bellingham, Wash., soon will close permanently because of market conditions, according to announcement by R. W. Hedley, president. The company was the third largest producer in the state in 1950, with output of 123,625 tons.

Colorado Fuel & Iron Co., through a contract with Utah Construction Co., will begin producing coal from a new mine with two 1,500-ft slopes in 1952. Located near Stonewall, Colo., the slopes will be 2 mi apart at the surface. Two tipples are being designed, one to process coal at 200 tph, the other to start at 350 tph with potential of 700 tph.

O. K. Coal Co., Canton, Ohio, plans to build a 300-tpd coal preparation plant to process industrial and domestic coals from deep and strip mines in Stark and Tuscarawas Counties.

The Anchor Coal Co., Farraday, Ky., has been organized to develop a 600-tpd truck mine on the Kentucky River near Kona. Donald Bates will be mine manager. Shipments will be made on the L. & N. R. from Kona after a 2-mi truck haul.

Sharon Steel Co. is making tentative plans, subject to approval by the board of directors, to build a \$1,250,000 coal-washing plant at its Jo-Anne mines, Rachel, W. Va.

A. B. Crichton, president, Johnstown Coal & Coke Co., has purchased four tracts of coal land and some surface land totaling 1,549 acres in Summerhill and Portage Townships, Cambria County, Pa. The sale was made by the Manor Real Estate & Trust Co., a subsidiary of Pennsylvania R. R.

Peabody Coal Co.'s new No. 10 mine, Christian County, Ill., will be completed and in full production by October, 1952. The mine is expected to produce 13,500 tpd. Development of another new mine, to be known as No. 11, at Taylorville, Ill., will start about the time Mine No. 10 is completed.

Carpenter Coal Mining Co., newly

NEWS OF YOUR ORGANIZATION is also interesting to others, so why not make it a point to inform COAL AGE of personnel changes among your staff members, mine-development plans and unusual company activities.

THEY GO TOGETHER...

**MOBILE MINING
EQUIPMENT...**

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TWIN PARALLEL
CABLE**



Mining's rugged work...it takes skilled men, specialized equipment—and the toughest cable made.

Hazacord Twin Parallel Mining Cable is engineered throughout for this exacting service. Notice the tough Hazaprene Sheath...vulcanized under pressure in continuous metal molds, it has the smooth finish, density, resistance to flame, moisture, abrasion and tearing required for safety and long life. It completely encases each insulated conductor, forming an extra cushion and protective barrier between the conductors in Type W and between the power and grounding conductors in Type G.

Notice the flat, compact design...the interlocking construction...the non-rotting, moisture-resistant open

braided reinforcing cord...the long-aging tough rubber insulation. Hazacord Twin Parallel Mining Cable is designed for rugged duty...for long-lived performance that means extra economy. Approved by Pennsylvania Department of Mines and accepted by U. S. Bureau of Mines—"P-104BM" is molded into sheath at frequent intervals. Write today for complete information on Hazacord Twin Parallel Cable or ask your Hazard representative for the full story. Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pa.

HAZARD

Insulated wires and cables for every mining use





ADD THINGS THAT CAN BE DONE ON STRIP BANKS—Warner's Skyline Theater, south of Clarksburg, W. Va., where movie fans watch Hollywood films from parked cars. A swimming pool is in the hollow.

organized subsidiary of Dexter-Carpenter Coal Co., has acquired the Kessler mine, formerly owned by the Cherry Hill Coal Co., at Blair, W. Va. Production has been resumed.

Broken Aro Coal Co., Okmulgee, Oklahoma, has leased coal rights to a large tract of land southeast of Wellston, Ohio, and plans to start operations there before the summer is out. The property formerly was operated by Buckeye Furnace Mining Co. The Broken Aro firm plans to move in with a 10-yd stripping shovel and to build a 250,000-ton-per-year tippie.

Glen Alden Coal Co. has permanently closed the S. Wilkes-Barre breaker

because it is out-dated, H. A. Dierks, vice president and general manager, has announced. The closing will have no effect on mining operations in S. Wilkes-Barre, where about 900 men are employed. Mine production will be hauled by rail to the Huber breaker in Ashley for cleaning.

Bell & Zeller Coal & Mining Co. has closed its Mine No. 2 at Ziegler. The announcement said the coal is worked out. However, a crew of men will be maintained at the No. 2 mine preparation plant to process coal from the company's new No. 3 mine. Earlier, in May, the company closed down its No. 15 mine, Mt. Olive, touching off a legislative investigation.

symbol and certified with: "Certified under CMP Regulation No. 1."

11. Rated orders for delivery of MRO materials or minor capital additions placed after July 6 must be labeled "MRO" or "DO-MRO" and certified as follows: "Certified under CMP Regulation No. 1." Certifications must be signed by the person placing the order or someone duly authorized to sign.

New Forms Required

Effective July 1, it became necessary for solid-fuel producers and processors to file Form CMP 4-C with DSFA instead of the original NPA Form F-24 when requesting authorization to start construction of industrial facilities. This does not apply to those who filed Form F-24 before June 7, and those who applied between June 7 and July 1 may not have to re-file. Form CMP 4-C will be mailed to producers directly from DSFA. In applying for permission to build, operators should file four copies.

More Cargo Vessels Shed Mothballs

An additional 33 reserve fleet freighters have been ordered removed from "mothball" bases to carry cargoes of coal and grain under the emergency program of the Economic Cooperation Administration. The vessels all are Liberty-class ships. This latest order brings to 220 the total number of national defense reserve ships called up from retirement.

DSFA Asks for Revised Data

About 1,000 Forms DSFO-1 have been returned to coal and coke operators because information submitted was inadequate or inaccurate, accord-

Defense Developments

CMP Regulation 5 Issued

Controlled Materials Plan Regulation 5, effective July 6, has replaced NPA Regulation 4, governing controlled materials and other goods for MRO and small capital additions. Features of CMP Regulation 5 are:

1. Base period for figuring MRO quotas is unchanged.

2. Quarterly MRO quota stands at 30% of base-period expenditures.

3. Limitation on rating for minor capital additions remains 10% of quarterly MRO quota or \$750, whichever is greater.

4. MRO quota may be ignored if rated MRO purchases do not exceed 20% of quarterly quota.

5. DO-97 rating is discarded. Use allotment symbol "MRO" and rating symbol "DO-MRO" instead.

6. "MRO" symbol is only for delivery orders for CMP materials, MRO and minor capital additions.

7. "DO-MRO" symbol is for uncontrolled materials, MRO and minor capital additions.

8. No rating is permitted for certain items in Schedules 1 and 2 of NPA Regulation 4.

9. DO-97 orders placed before July 6 for delivery in the third quarter automatically become controlled-materials orders. Likewise, DO-97 orders placed before July 6 for delivery in the third quarter automatically become rated orders with symbol "DO-MRO."

10. DO-97 orders for controlled or uncontrolled materials placed before July 6 calling for delivery after the third quarter must be converted before Aug. 15 into "MRO" or "DO-MRO" orders. To convert them, purchasers must provide supplies with a revised copy of the order or with written information identifying the order, showing "MRO" or "DO-MRO"



How to keep loaders loading

OPERATORS of this midwest mine found that transmission maintenance resulted in excessive downtime on their six Joy loaders . . . until a Standard Oil lubrication specialist recommended SUPERLA Mine Lubricant No. 4. A test on one loader was so successful that the lubricant was adopted for all six of the units.

Now, after three years of operation with SUPERLA Mine Lubricant No. 4, there has been no downtime because of scored clutch plates or faulty lubrication. Because SUPERLA Mine Lubricant No. 4 pours readily from the barrel at normal mine temperatures and is handled without difficulty by grease pumps, operators have found it particularly easy to apply.

To keep loaders loading in your own mine, and to keep all of your equipment



operating effectively through trouble-free lubrication, depend on Standard Oil products. There is a Standard Oil lubrication specialist located near your mine whose services are yours for the asking. Call your local Standard Oil Company (Indiana) office or write: Standard Oil Company, 910 So. Michigan Avenue, Chicago 80, Illinois.

What's your problem?



J. A. Grieve, lubrication specialist at Standard Oil's Decatur office, helped this midwest mine make important savings with SUPERLA Mine Lubricant No. 4. He was close at hand, able to give mine operators the kind of service they needed when they needed it.

There's a corps of such lubrication specialists throughout the Midwest, one of whom is located near your own mine. Through special training, plus a background of practical experience, this man has a knowledge of lubrication that can mean real savings to you. To obtain his services, simply contact the nearest Standard Oil office. Discuss with him the savings you can make with such outstanding products as:

STANDARD Industrial Oils—Here's one line of oils that provides cleaner operation of loader and crane hydraulic units; supplies effective lubrication in compressors, gear cases, and circulating systems. One or two grades can replace a wide variety of special oils and lubricants.

CALUMET Viscous Lubricants—On open gears and wire ropes, these greases strongly resist washing and throw-off. Their superior wetting ability affords better coating of gears and better internal lubrication of wire ropes.

STANDARD OIL COMPANY



(Indiana)

ing to DSF Administrator C. M. Connor. In returning the forms, Mr. Connor explained that "accurate and complete information is vitally important to facilitate the Defense Solid Fuels program for providing allocation assistance to the coal and coke industry which is rapidly being processed under the Controlled Materials Plan." He urged operators receiving the form to make the needed corrections or additions and return it immediately to DSFA.

Defense Act Extended

Stop-gap legislation passed at the end of June extended wage, price and production controls at least until July 31. The measure forbids any further price rollbacks and bans OPS controls on goods or services not previously under ceilings.

DPA Grants Fast Write-Offs

Defense Production Administration has granted certificates of necessity including fast tax write-offs for coal-production expansion projects at Emerald Coal & Coke Co. and Bethlehem Steel Co. Emerald obtained a 65% fast write-off for a cleaning-plant and mechanization program totaling \$2,600,000; Bethlehem, for projects at eight mines totaling \$7,708,000.

Ceiling Price Extended

Ceiling price order covering producers of coke, coal chemicals and coke-oven gas has been extended until September 30 under terms of GCPR SR 13, Amendment 2. The regulation is a temporary one designed to serve pending a specific order based on further studies of the industry.

Aid Asked in Fuel Drive

Secretary of the Interior Oscar L. Chapman has asked all state governors to join in the federal government's summer fuel-buying program to avert spot shortages of oil and coal next winter. Government officials continue to express concern at a probable transportation bottleneck in the fall. In his request to the governors, Secretary Chapman urged that they appoint a member of their staffs to coordinate a summer buying program and enlist public support for the drive.

See Natural Gas Lack

Natural-gas interests and representatives of the Gas Division, Petroleum Administration for Defense, met July 9 in Washington to study proposed restrictions on future expansion of the industry. Following the meeting, PAD spokesmen declared that the restrictive order, when and if issued, would exempt some states and areas fully or in part, including New York State and New England.

PAD officials also assured the industry that no curtailment order would be issued until after July 23, when the agency is scheduled to meet with the Gas Industry Advisory Council.

Several days prior to the July 9 meeting it had been announced that Bruce K. Brown, Deputy Petroleum Administrator, has prepared an order imposing restrictions on supplies of gas to new consumers. The order will be withheld pending discussions with Secretary of the Interior Chapman

and representatives of the gas industry. Defense demands for steel, it was explained, have prevented the completion of pipelines and the Nation now faces an extremely tight supply situation in natural gas. The quantity of steel allocated to pipelines by NPA for the third quarter is only 50% of the needs of the industry. The draft order would forbid suppliers of natural gas to serve any new space-heating or large-volume customers without prior approval of PAD.

Among the Manufacturers

Goodman Mfg. Co., Chicago, has named Richard Hawkins manager of its foreign department, replacing Roy Bigelow, who recently retired. Mr. Hawkins, a graduate of Lehigh University, School of Mining Engineering, has spent many years in Australia and New Zealand as a Goodman representative, and also formerly was sales supervisor in the export department of Allis-Chalmers general machinery division. Robert F. Goudge, has been assigned to the sales staff of George Clemens, Goodman district manager at Salt Lake City, Utah. Before joining Goodman, Mr. Goudge served in an engineering capacity with Pond Creek Pocahontas Coal Co. and Island Creek Coal Co. in West Virginia, and also was associated with several metal-mining companies.

Chain Belt Co., Milwaukee, has announced the appointment of several new district sales engineers, as follows: Philadelphia, Edward D. Williams; Kansas City, Truman J. Hamel, formerly in the company's research engineering division; and Cleveland, Kenneth Burch, formerly associated with the Ohio Edison Co. Mr. Burch will now work with the Cleveland District Sales Office.

John E. Powers, formerly manager of automobile tire sales, has been named trade sales manager of the General Tire & Rubber Co., Akron, Ohio. Mr. Powers joined General in 1934 as a territory sales representative and has held various executive sales posts since then.

Carver Pump Co., Muscatine, Iowa, has elected Gordon L. Chapman president, advancing Roy J. Carver, founder of the company, to chairman of the board. Mr. Chapman joined the company in 1948 as comptroller and later that year was elected vice president and a director. The company also has announced the election of Alexander A. Zuber, plant manager, as a vice president and a director.

Reliance Electric & Engineering Co., Cleveland, has appointed Lloyd F. Giegel branch manager of its Gary, Ind., sales office, and has added Daniel

J. Donnelly to its Philadelphia office in a sales engineering capacity. Mr. Giegel joined Reliance in 1947 and has been attached to the company's applied engineering department. Since joining the company in 1950, Mr. Donnelly has been handling special assignments for the product sales department.

Air Reduction Co., Inc., New York, has appointed S. D. Baumer vice president of the Aircro Equipment Mfg. Div. Joining the Aircro general technical sales department in 1941 as steel mill specialist, Mr. Baumer was appointed assistant manager of the department in 1944 and manager in 1948. Edward H. Roper, with the company since 1936 and assistant manager since 1948, has been named manager of the general technical sales department, succeeding Mr. Baumer.

Brooks Oil Co. has elected Henry W. Winkler vice president in charge of research and laboratory control and Joseph A. Rigby vice president in charge of engineering and sales. Prior to his election, Mr. Winkler was chief chemist of the company for 8 yr. With Brooks since 1944, Mr. Rigby formerly was manager of engineering and sales.

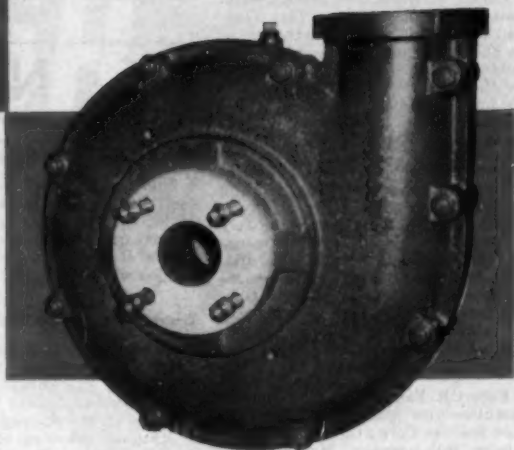
Douglas J. Donohue has been appointed Atlantic district sales manager for Trumbull Electric, Dept. of General Electric Co., Plainville, Conn., with offices in Philadelphia. Mr. Donohue joined Trumbull in 1930 in the company's Pacific northwest region. He became head of that region's engineering activities in 1940, and since 1945 has been a salesman for its eastern territory.

American Wheelabrator & Equipment Corp., Mishawaka, Ind., has reorganized and expanded its sales staff with new duties assigned as follows: L. L. Andrus, formerly vice president in charge of sales, promoted to vice president and executive head of the Dust & Fume Div.; John A. Silver, formerly with Lester & Silver, management and sales consultants, appointed director of sales; E. B. Rich, Chicago representative, named general sales manager; A. E. Lenhard, adver-

Change-overs are easy—with **HYDROSEALS**



Suppose you have an A-Frame Hydroseal like the one above. For a year or two now, it's been operating in the capacity range of from 25 to 150 G.P.M., with perhaps a million-ton-plus record of abrasives pumping behind it. Now you need a bigger pump because of expanded output in the war effort. But you don't have to buy a whole new pump for the job. . . . All you have to do is

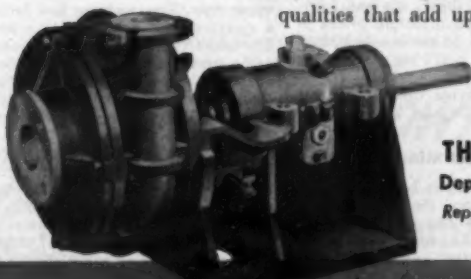


get a larger shell and liner, and you have an AB-Frame Hydroseal with a capacity range of from 75 to 300 G.P.M. After only a few minutes' work, you've doubled your pumping capacity! The pump impellers are interchangeable in this range, which makes the conversion all the easier and more economical. Furthermore, you can quickly adapt Hydroseals for slurry, sand, and dredge applications, as required.



The B-Frame (250 to 700 G.P.M.) and C-Frame (600 to 1800 G.P.M.) also be doubled in capacity, but in these ranges the impellers must also be changed to effect the conversion.

Such flexibility in size and application is inherent in the design of Hydroseal Pumps and Pumping Systems, and it's just one of the qualities that add up to perfection in abrasives handling.



**For complete data—
write for Catalog 451.**

THE ALLEN-SHERMAN-HOFF PUMP CO.
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SAND, SLURRY & DREDGE PUMPS
MAXIMIX RUBBER PROTECTED

HYDROSEAL, PACKLESS AND MAXIMIX DESIGNS ARE COVERED BY PATENTS AND APPLICATIONS IN THE MAJOR MINING CENTERS OF THE WORLD

tizing and sales promotion manager, assigned new responsibilities; and S. S. Deputy, sales manager, to work closely with the general sales manager on special assignments.

Richard W. Sabins, former senior staffman in charge of mechanical goods advertising and sales promotion for the Goodyear Tire Rubber Co., Akron, Ohio, has been named manager of distributor sales in the company's mechanical goods division, succeeding W. T. Bell, who died recently.

Lionel E. Booth has become associated with Hardinge Co., Inc., York, Pa., and will direct the activities of its Salt Lake City office, now being re-established. Independently of his work for Hardinge, Mr. Booth will continue his former engineering activities and the sale of the Booth flotation machine.

International Harvester's motor truck retail branches and dealers are participating in a nation-wide truck conservation program that began July 1. W. C. Schumacher, general manager of the company's motor truck division, has reported. Free-of-charge inspection service for the nearly 1,000,000 International trucks now in service is being offered for a 90-day period as first step in the complete International truck saving plan.

Robert R. Fahrland has been named executive vice president of the Midland Sealite Corp., Cleveland. Before joining the company, Mr. Fahrland was in charge of east side operations for the Fahrland Fuel Co., Cleveland.

Mosebach Electric & Supply Co., Pittsburgh, celebrated the 25th anniversary of the company's founding June 23 with an open house featured by dedication of an oil painting of the late Karl J. Mosebach, founder and past president. Scheduled for 2 yr ago, the silver anniversary celebration was cancelled at that time because of the death of Mr. Mosebach.

Quaker Rubber Corp., Division of H. K. Porter Co., Inc., Philadelphia, has opened a stock-carrying branch warehouse and sales office at 872 Milwaukee Ave., Detroit, Mich. J. R. Alexander, who has been with the company for over 7 yr as a territory salesman and most recently as district manager for Cleveland, has been named district manager of the new branch.

John Lawrence, formerly technical vice president in charge of manufacturing, engineering and research for SKF Industries, has been elected vice president in charge of manufacturing, Joy Mfg. Co.

Marion Power Shovel Co., Marion, Ohio, has elected John P. Courtright as executive vice president. Mr. Courtright has been associated with the company since 1927, first working out of the Chicago office and later being made Chicago district manager. He

was made sales manager at the Marion, Ohio, office in 1937 and became vice president in charge of sales in 1941.

De Laval Steam Turbine Co., Trenton, N. J., has announced the following executive promotions: James P. Stewart, formerly executive vice president, has been named president. He has been with the company since 1946. Wencel A. Neumann, formerly manager, IMO-De Laval Products Division, has been elected vice president for industrial sales. Mr. Neumann

came to De Laval in 1946 from Westinghouse Electric Corp. H. G. Bauer has been named vice president for engineering and will continue as manager of marine sales. Mr. Bauer joined the company in 1937, was made executive engineer in 1948 and was elected vice president in 1949. Charles A. Jurgenson has been made vice president of manufacturing and will continue as works manager, a position he has held since 1948. Mr. Jurgenson has served in various supervisory and executive assignments since he joined the company in 1931.

News In Brief

Generator Will Burn Anthracite

Pulverized anthracite will be the fuel for a new 40,000-kw generator to be installed by Scranton Electric Co. to increase power output at the company's Harding plant. The \$10,023,000 job will be completed in 1963.

Glen Lyon Strike Ends

A two-day strike of workers at No. 6 mine, Susquehanna Collieries Div., Glen Lyon, Pa., ended July 12 after approval of settlement terms by the union local. The stoppage grew out of a grievance affecting one job in the mine substation. Though the dispute was reported to have been settled the same day, miners refused to return to work without first voting in their local.

Pursglove Sees Strong Industry

A major comeback is around the corner for the coal industry, Joseph Pursglove Jr., vice president—research, Pittsburgh Consolidation Coal Co., said recently. Admitting that competitive fuels have taken a strong hold in recent years, Mr. Pursglove predicted that coal will move into "more and more situations occupied by liquid fuels and gases" after 1955. "As crude oil becomes more and more expensive to produce and the demand for the lighter petroleum products keeps exceeding domestic supply, refiners will want to convert more and more crude oil into gasoline, diesel oils and furnace oils that bring premium prices in the marketplace. In other words, less and less fuel oil, coal's big competitor, will be produced," he said.

Coal must provide the muscles for defense production, he said.

New Lab to Test Mine Air

A new laboratory is being set up at the Federal Center, Denver, Colo., to analyze mine-air and coal-dust samples, J. H. East Jr., regional director, U.S.B.M., recently announced. The laboratory eventually will do all such testing for states west of the Missis-

sippi. The tests now are made in Pittsburgh. Albert Maxian, bureau chemist, will be in charge.

Senate Passes Coal Bill

The Illinois Senate late in June approved and sent to Gov. Stevenson for signature a series of bills requiring local governments to buy Illinois coals if the price is not higher than that for out-of-state coals. The bills apply to cities, counties, park districts, Chicago government units, state institutions and other public agencies.

Fire Hits Simpson Creek Mine

State mining department crews late in June began fighting a fire that broke out about 2½ mi from the entrance of Mine No. 3, Simpson Creek Collieries Co., Galloway, W. Va. The fire was discovered during a routine firehose inspection in an area where miners had been removing timbers after work had been halted in that section.

Companies Report Profits

Peabody Coal Co. and subsidiaries report consolidated net earnings in the year ended April 30, subject to year-end audit, as \$2,284,171 after provision for federal income taxes, against \$702,754 after taxes in the preceding year; per-share earnings, \$2.06 against a loss of 15c in the previous year. The company has declared a quarterly dividend of 31¼c on its 5% convertible prior preferred shares and a first-quarter dividend of 15c per share on common stock. Net sales in the year now closed totaled \$65,424,698 and 14,186,564 tons against \$42,402,204 and 9,175,760 tons a year ago.

Truax-Traer Coal Co. reports net income for the year ended April 30 as \$4,025,823 or \$3.85 per share, against \$1,514,021 and \$1.54 in the previous year. Sales for the latest year totaled \$57,503,835 and 9,107,965 tons against \$26,316,580 and 6,177,459 tons in the previous year.

Blue Diamond Coal Co. reports net

J&L STEEL

RUSH

TO
Scrap
DEALER
U. S. A.

to STEEL USERS

Unless dwindling scrap piles are replenished immediately, steel production will suffer. *Extra* scrap is needed—above and beyond the “working” scrap which steel users regularly sell.

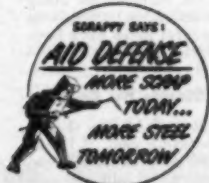
Comb YOUR Mine!

How much valuable scrap do *you* have just lying around? Old machines and equipment . . . useless parts . . . odds and ends. This is the kind of scrap that's urgently needed now. It will get more steel for everybody.

Here's a Quick Way-

Put *one* man in charge of getting all the scrap in your operation collected and turned over to your scrap dealer. Set the date for the job to be done.

Do it NOW!



JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH 30, PA.

COAL MEN ON THE JOB



ROBEY RUN COAL CO., Ruby mine, Lumberport, Harrison County, W. Va.—Posed in a "No Parking" area near the mine are: H. D. Shaffer (left), general mine foreman; John Spino, construction foreman; and Tom O'Hara, superintendent.



PEABODY COAL CO.: In new welded-steel mencear, Mine 40, Corinth, Ill.: Supt. John Williamson (standing); William Whyte (left), shop foreman; Hobart Somers, repairman; Teets Boyett, top boss; Cliff Bond, welder; and John Malone, machinist.

income for the year ended March 30 as \$1,636,300 or \$16.36 per common share, against \$1,143,131 or \$11.43 per share in the previous year.

Island Creek Coal Co. reports consolidated net profit for the first quarter of 1951 at \$1,273,502, or \$1.04 per share of common after deducting \$37,904 for preferred dividends. This compares with \$802,718 and 64¢ for the corresponding period in 1950.

Peabody Workers Study First Aid

First-aid training classes started up July 11 for employees of Peabody Coal Co. in preparation for the National First Aid and Mine Rescue Contest scheduled for Columbus, Ohio, Oct. 2-5. Classes are being taught by mine-rescue supervisors of the Illinois Department of Mines & Minerals. When training is finished, teams will compete in a company-wide contest to determine which group will represent the company at the Columbus meet.

Utilities Boost Coal Use

Federal Power Commission reveals that coal consumption by electric utilities in the first 4 mo of 1951 was 24% above the corresponding period last year. Through April, 1951, the electric companies burned 35,122,000 tons compared with 28,265,000 tons in the previous period. At the present rate, utility coal use in 1951 will pass the 100,000,000-ton mark, according to Bituminous Coal Institute.

Miners Strike Clinchfield

Some 700 miners of the Lick Fork mine, Clinchfield Coal Corp., Clintwood, Va., left their jobs June 26 in a dispute over who should work in a new section of the mine. Men were

said to have been brought over from nearby Dante, Va., to work in the new section. Veteran employees felt they should have had the jobs. The walkout at Lick Fork followed other stoppages late in June at the company's mines at Clinchco and Meade Fork, where miners struck in support of company-store clerks who sought recognition of UMW United Construction Workers as their bargaining agent.

Coal Company Must Pay

Jeddo-Highland Coal Co., Jeddo, Pa., rather than the state Workmen's Compensation Board must pay the bulk of compensation to a disabled employee, according to a ruling handed down June 29 by Superior Court Judge J. H. Flannery. Crux of the case was the date when liability was incurred. The employee had been laid off June 18, 1946, some 3 mo before the date of issue of the Pennsylvania Workmen's Compensation Fund. The employee, a victim of silicosis, became totally disabled Feb. 17, 1947. The company contended that liability was incurred at the later date and therefore fell to the state. Judge Flannery's ruling reversed a decision of the compensation board, which had held the state liable, and directed the company to pay 80% and the state 20% of the compensation due the employee.

Safety Meet Set for October

The 1951 National First Aid and Mine Rescue Contest has been scheduled for Oct. 2-4 at the state fair grounds, Columbus, Ohio. Some 500 men from the mineral industries are expected to enter the competition. Information may be obtained from W. H. Tomlinson, U. S. Bureau of Mines, Vincennes, Ind.; or from Earl Maize, director, Safety Division, National Coal Association, Washington 5, D. C.

Fires to Be Snuffed

Pennsylvania Governor John S. Fine has approved a set-aside of \$35,000 from the state's disaster fund to fight a long-smoldering mine fire burning under the town of Mt. Carmel. The money will be paid as soon as local officials obtain the remaining two-thirds of the total needed from the federal government. Although federal aid must be obtained by local interests, the planning and control of the fire-fighting job will be at the state and federal level.

Elsewhere, Hunt Construction Co., Steamboat Springs, Colo., recently submitted the low bid in a Bureau of Mines project to put out a coal fire that has been burning for 15 yr in Rio Blanca County, about 70 mi west of Craig. All bids, including the one by Hunt, will be passed to the Department of the Interior in Washington for final scrutiny.

Strip Land Reclaimed in Ohio

A total of 3,217 acres of land stripped for coal and other minerals in Ohio was reclaimed this year by the Ohio Reclamation Association for 68 of its members or by the member companies themselves. This exceeds the total for the previous year by 592 acres. Of the total acreage, 1,776 acres was planted with 1,642,800 trees and 1,441 acres was seeded to grass and forage crops. All reclaimed strip lands this year were graded to conform with Ohio law and all reclamation costs paid by the operators. In addition to the plantings, several lakes have been started and stocked with fish.

Union Pacific Stands by Coal

Freight locomotives of the Union Pacific R. R. operating east of Green River, Wyo., will keep on using coal "as long as economic conditions permit and the cost . . . is competitive

"EUCS"

Are Your
Best Bet!

FOR BIG LOADS

FOR LONG HAULS

FOR SHORT HAULS

FOR LASTING STRENGTH

Because of their rugged construction and dependable performance, Rear-Dump Euclids are standard equipment on hundreds of mine, quarry, and construction jobs. For moving rock, ore, overburden and other heavy excavation, "Eucls" have the capacity and speed to haul bigger loads faster and at lower cost per ton or yard moved.

Look at the record! Of the thousands built, nine out of eleven Euclids are still in use today! They're job proved...have earned their

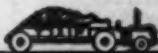
reputation for staying power, low-cost production and efficient operation on a wide range of work.

Owners know from experience that they can depend on prompt, efficient service from Euclid's world-wide distributor organization.

Euclids are your best bet for more loads per hour and more profit per load. Write for information on the complete line of Euclid equipment, or call your Euclid Distributor today.

The EUCLID ROAD MACHINERY Co. Cleveland 17, Ohio

EUCLIDS



Move the Earth

CUT COSTS OVER 60%



Pressure-Creosoted Oak Ties Used in a Coal Mine's Main Haulageway.

● With today's high-speed, heavy-tonnage haulage, there's no place for bad ties. They represent a serious hazard. And frequent replacements run into too much money.

Koppers Pressure-Creosoted Timber Ties are protected against decay. They retain their strength. Because of their exceptionally long life, they effect substantial savings.

For example, 3,809 sawed southern pine ties, each impregnated with creosote, were installed in a location where untreated ties had lasted, on the average, only 4 years. It was estimated that the treated ties would last 20 years; on this theoretical basis, the cost per year

would be cut by more than 62%, and the net savings for the installation would be about \$12,000.

After 21 years' hard service, this haulageway was inspected, and its performance reviewed. *The anticipated savings had been fully realized!* Moreover, more than 97% of the ties were still serviceable; therefore, the eventual savings will be even greater.

In many other places, Koppers Pressure-Treated Wood can save money for mine operators. For full information, send for our free book, "10 Proven Ways to Cut Mining Costs." Mail in the handy coupon, and this helpful book will be on its way to you.

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PRESSURE-TREATED WOOD



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Pittsburgh 19, Pa.

Please send me a free copy of "10 Proven Ways to Cut Mining Costs."

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with oil," A. E. Stoddard, president of the railroad, recently told a group attending the 27th annual "Old Timers' Day" of the Union Pacific Coal Co.

I. N. Bayless, president of the coal company, at the same time urged miners to keep the parent company's locomotives "filled with coal rather than oil. We can do this by producing coal at a price that will enable the railroad to use it."

Mr. Stoddard's statement, the company's first official fuel-policy announcement, reassured miners who had been watching uneasily the railroad's increasing use of diesels.

Pocahontas Output Up

Coal production in the Pocahontas field for the first 6 mo of 1951 ran 2,500,000 tons above the same period in 1950. Up to June 30, 1951, output totaled 13,422,311 tons against 10,922,445 tons in the previous period. Operators point to high-level market conditions prevailing thus far.

NLRB Scores Union

The National Labor Relations Board July 3 issued a cease-and-desist order against the UMW United Construction Workers, forbidding further interference with employees of Carbon Fuel Co., Kanawha County, W. Va. The action grew out of union efforts to organize firms supplying timbers to coal-mining companies. Though the NLRB dismissed charges of unfair labor practices, it found that the union had encouraged Carbon workers to strike and to refuse to use or handle timbers unless provided by union members.

Coal Buyers Visit Hanna

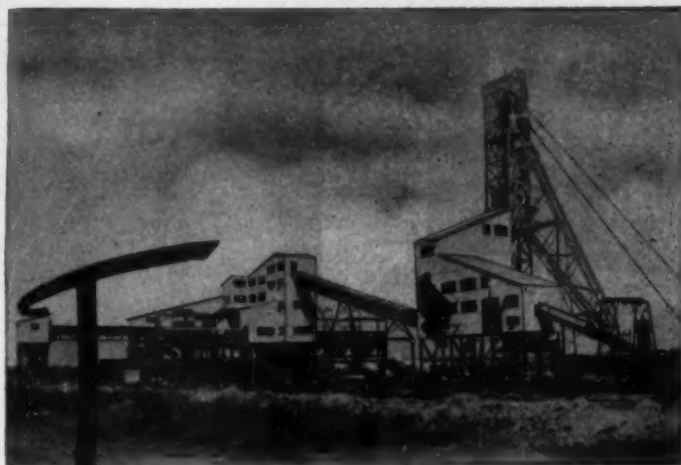
Nearly 100 industrial buyers of coal in northern Ohio traveled by special train June 22 for a one-day tour through the world's biggest coal preparation plant at Georgetown, Ohio. The plant is operated by Hanna Coal Co. The visitors represented railroads, electric utilities and other big industrial coal users.

Town Bans Strip Mining

The village of Winterville, Ohio, has been upheld by the 7th District Court of Appeals in its ban on strip mining within the corporate limits. The recent ruling, on July 2, held that the Common Pleas Court was correct in sustaining the anti-stripping ordinance.

Texas Teachers Get Coal Facts

Twenty-five Texas teachers making up a "traveling workshop" from Texas State College for Women, Denton, visited Washington and Pittsburgh in June to make a special study of coal's significance in the Nation's economy. They were guests of Bituminous Coal Institute in Washington and of Pittsburgh Consolidation Coal



Two-Way Efficiency

The new plant at Peabody Coal Company's Pana Mine No. 17 is designed for maximum flexibility. It may be operated in either of two ways:

1. The $1\frac{1}{2}' \times 0$ coal may be diverted to railway cars for power plant use and the lump, egg and nut sizes retained for domestic fuel uses.
2. The entire mine output may be converted to $1\frac{1}{2}' \times 0$ for power plant use.

The plant has a capacity of 600 TPH of ROM coal. The plus 6" lump is hand picked and can be either delivered to cars or local trade bins for domestic use or crushed to pass 6" and returned to the natural 6" x 0.

Out of this 6" x 0 the $1\frac{1}{2}' \times 0$ is screened by a Parriah-type shaker screen and loaded for power plant use. The 6" x $1\frac{1}{2}'$ is washed in a 72" wide single Tandem Hydro-Separator at the rate of 312 TPH, drained and sized. These washed sizes may then be either loaded or crushed to $1\frac{1}{2}' \times 0$.

Helping companies like Peabody solve problems like this is our business . . . and has been for many years. Whether you are interested in plant modernization, improving efficiency, increasing production or lowering costs, you'll find it time well spent to discuss plans with us. There's no obligation. Just write or phone.

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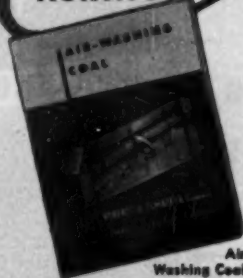
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ARE YOURS
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Washing Coal

This bulletin, No. 175, contains full details about the advantages of air washed coal . . . explains why dry coal has higher B.t.u. . . . how the R. & S. Super Airflow Cleaner separates the dust which may then be recombined with the clean coal or discarded. Detail charts, diagrams and photographs are included.



Wet
Washing for
Pre-sized Coal

Bulletin No. 176 gives you a comprehensive view of the five basic types of Roberts and Schaefer wet washing machinery. Each has its own particular advantages and applications. Each has its own limitations. Considered together they are capable of meeting any conceivable wet washing requirement. Fully illustrated including diagrams and capacity charts.



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Hardinge
Counter-Current
Heavy Media Separator

The many advantages that occur from the use of this modern equipment are discussed in detail in this bulletin, No. 177. Photographs and diagrams show the operating principles and construction features.

Write for any or all of these informative bulletins. ROBERTS & SCHAEFER COMPANY, 130 North Wells Street, Chicago 6, Illinois.

These Liner Plates "GET DOWN TO BUSINESS" IN A HURRY



When your business is underground, it pays to reach "pay dirt" quickly and economically. This is why Armco Liner Plates are getting the call more and more often from coal mining men.

Armco Plates have corrugated metal design to provide great strength without excess weight or bulk. They are easy to handle and install. One man can carry, hold and bolt a section into place with a simple hand wrench. The job moves fast and costs are low.

Other advantages include fire-resistance and freedom from excessive maintenance.

Use Armco Liner Plates for sloped or vertical entries, air shafts, and wherever else you need the protection of a steel liner. There is a size and gage for every requirement. Write for complete information. Armco Drainage & Metal Products, Inc., 2391 Curtis St., Middletown, Ohio. Subsidiary of Armco Steel Corporation.

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ARMCO LINER PLATES



COAL MAN ON THE JOB



THE NEW RIVER CO., Mt. Hope, W. Va.—
H. G. Houtz, ventilation and drainage engineer.

Co. in Pittsburgh. Dr. M. Edmund Speare, BCI educational director, briefed the teachers for their Pittsburgh visit, which included a tour of Pittsburgh Consol's 11,000-tpd coal preparation plant.

Association Activities

Big Sandy-Elkhorn Coal Operators Association re-elected B. F. Reed, Drift, Ky., as president at a meeting held in Lexington, Ky., June 22. Other officers were named as follows: vice president, W. W. Goldsmith, Charleston, W. Va.; treasurer, J. R. Hurt, Prestonsburg, Ky.; chairman of the board, Harry LaViers, Paintsville, Ky.; labor adviser, T. W. English, Ashland, Ky.; safety director, J. H. Mosgrove, Pikeville, Ky.; and executive secretary, H. S. Homan.

Colorado & New Mexico Coal Operators Association has elected W. H. Peltier, president, Keystone Coal Co., Denver, president for the coming year. Other officers were named as follows: vice presidents, J. R. Kastler, St. Louis, Rocky Mountain & Pacific Coal Co., and W. D. Corley, W. Corley Jr. Co., Colorado Springs; secretary-treasurer, O. F. Bridwell.

Anthraccite Section, American Institute of Mining & Metallurgical Engineers, at its annual summer meeting July 9 in Scranton, Pa., elected the following officers: chairman, D. C. Helms, vice president, Lehigh Navigation Coal Co.; vice chairman, John M. Reid, general manager, The Hudson Coal Co.; and secretary-treasurer, Floyd Sanders, Goodman Mfg. Co. The following were named members of the executive committee: one-year term—A. E. Ross, Sprague & Henwood, Inc.; three-year terms—K. F. Arbogast, Lehigh Valley Coal Co.; Joseph Crane, Locust Coal Co.; J. T.

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UNITED STATES STEEL

Griffiths, The Hudson Coal Co.; and
A. E. Dick, Jr., Dick Construction Co.

Virginia Coal Operators' Association at its annual meeting July 6 in Norton, Va., elected the following officers: president, secretary and treasurer, George H. Easer; vice president, H. W. Meader, Stonoga Coke & Coal Co.; assistant secretary and assistant treasurer, E. H. Robinson.

Preparation Facilities

Wise Coal & Coke Co., Dorchester, Va.—Contract closed with Western Machinery Co. for design and installation of a 200-tph washing plant to handle 6x0 ROM, including a No. 4C (Modified) Wemco Mobil-Mill prefabricated heavy-media separation plant for 135 tph of 6x½ coal and a Wemco 8x12-ft double-drum separator to make two-gravity separation.

Floas Coal Co., Minersville, Pa.—Contract closed with Wilmot Engineering Co. for one 6-ft-diameter Wilmot Hydrotator to prepare Buckwheat No. 1; feed capacity, 60 tph.

Sun Valley Coal Co., Scotch Valley, Pa.—Contract closed with Wilmot Engineering Co. for one 3½-ft Wilmot Hydrotator to prepare stove coal; feed capacity, 40 tph.

DeBardleben Coal Corp., Sipsey, Ala.—Shipment by Deister Concentrator Co. of one SuperDuty diagonal-deck coal-washing table for cleaning ¾x0-in size and one Model 109 Concenco revolving feed distributor.

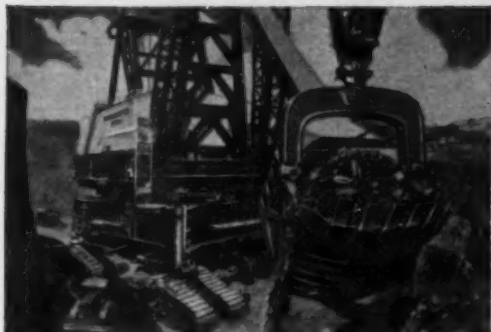
Valley Camp Coal Co., Elm Grove, W. Va.—Shipment by Deister Concentrator Co. of seven SuperDuty diagonal-deck coal-washing tables for cleaning ¾x0-in coal and one Model 108 Concenco revolving feed distributor for seven-way feed distribution.

American Gas & Electric Co., Meigs County, Ohio—Contract closed (by Jeffrey Mfg. Co.) with Roberts & Schaefer Co. for one 7-ft, 2-compartment, 4-cell Baum jig for 5x½-in coal; capacity, 400 tph.

Colorado Fuel & Iron Co., Pueblo, Colo.—Contract closed (by Jeffrey Mfg. Co.) with Roberts & Schaefer Co. for two 7-ft, 3-compartment, 6-cell Baum jigs for 1½x0-in coal; capacity, 165 tph each.

Coal Men Oppose Rail Freight-Rate Rise

Strong protests from coal men and government agencies were registered beginning July 9, when the Interstate Commerce Commission opened final hearings on the railroads' petition for a 15% increase in freight rates. Coal representatives contended that the industry cannot absorb further freight-



BIGGEST STRIPPER—at the Hanna Coal Co.'s Georgetown, Ohio mine — strips enough overburden in one bite to fill an average living-room, can swing its load two-thirds of a city block! This Marion-built giant is lubricated 100% by Socony-Vacuum!



BIGGEST CONTINUOUS MINER—rips into a seam of coal and loads it at the rate of two tons per minute! Working with builder — Joy Mfg. Co.— Socony-Vacuum provided right lubricants for gears, hydraulic mechanisms, bearings — all moving parts!

BIG IN EVERY FIELD STRIP, SLOPE AND SHAFT!



BIGGEST SHAFT MINE—Chicago, Wilmington & Franklin's Orient No. 2 Mine, West Frankfort, Ill.— protects its giant loaders, drills, cutters and virtually all other production equipment with famous Gargoyle oils and greases!

Why Accept Anything Less?

There are good reasons why all leading builders of coal mining machinery approve the use of Gargoyle lubricants — why so many of the successful operators of strip, slope and shaft mines protect their costliest equipment with these superior products!

Famous Gargoyle oils and greases are top quality — backed by 85 years of lubrication experience. Performance records in mines of every size and type prove they help increase efficiency, boost tonnage, materially cut downtime and maintenance costs.

Why accept anything less for *your* mine?



SOCONY-VACUUM

Correct Lubrication

**WORLD'S GREATEST LUBRICATION KNOWLEDGE
AND ENGINEERING SERVICE**

SOCONY-VACUUM OIL COMPANY, INC., and Affiliates: MAGNOLIA PETROLEUM COMPANY, GENERAL PETROLEUM CORPORATION

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CONVERTED
GOODMAN
480 LOADING
MACHINE

Now! CONVERTED LOADING MACHINES

With ten years of cutting machine conversion experience as a background, the Lee-Norse Company, after exhaustive analysis, has pioneered another development in the modern trend toward trackless mining—TRACKMOUNTED LOADING MACHINES CONVERTED TO RUBBER TIRE MOUNTINGS!

Save on your present investment and lower your production costs... take advantage of the desirable, mobile features of rubber-tired mining equipment... CONVERT YOUR LOADING MACHINES NOW!



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The Lee-Norse Company specializes in converting track-mounted cutting machines and loaders to rubber tires... conversions that can result in modernization and years of additional service to your present track-mounted equipment. Rubber-tired mining equipment permits faster tramming at the working face and minimizes the wear-and-tear on your mine road beds. Profit by the advantages of trackless mining now! IT'S SMART... TO CONVERT!

Our engineers will be pleased to furnish estimates and delivery dates on converting your track-mounted cutting machines and loaders. Write or telephone...

Lee-Norse Company

CHARLESTON, PA.

rate boosts, that the present high rates are causing coal customers to swing to other fuels, that higher rates will increase movement of coal by trucks and that the asked-for boost will weaken coal's competitive position.

On the government-agency side, officials of the Economic Stabilization Agency said that the proposed increase would set off a chain reaction on prices generally and add to inflationary pressures. Agriculture and Commerce Department officials expressed doubt that the economy can absorb a further freight-rate increase and argued that the railroads had failed to prove their need for the increase.

It was indicated that the ICC will take about a month to study the evidence and hand down a decision.

Kentucky Agency Cites Cause of Death Rise

Carelessness and overconfidence are the major causes of the upward turn in coal-mine fatalities in Kentucky this year, the Kentucky Department of Mines & Minerals said in a report issued July 12. The report cited 54 deaths in the first 6 mo of 1951 as against 30 in the corresponding period in 1950.

The department reported that the average experience of men killed this year was 19 yr. "Inexperience, therefore, is not a principal cause," the agency said, "but, rather, familiarity with danger has made some men careless and overconfident. Human failure is the largest contributory cause of accidents."

Of the total deaths thus far in 1951, 42 have occurred in underground rail mines, 10 in underground truck mines and 2 in strip mines.

House Group Approves Depletion Allowance Boost

The Ways & Means Committee, House of Representatives, reaffirmed July 10 its prior tentative decision to increase percentage depletion allowance on coal from 5 to 10%. The committee also has adopted a proposal to treat coal royalties as a capital gain instead of ordinary income. These two proposals are expected to go into the final draft the committee will submit to the House in the \$7 billion tax bill.

Coal Inspectors Moved To Pittsburgh Area

Three federal coal inspectors have been moved from Washington, D. C., to Pittsburgh, Pa., to speed sampling of coal offered for sale to the government. The three inspectors will instruct men responsible for sampling coal delivered to Army, Navy and Air Force bases. Unless a mine's coal has been sampled and analyzed in the



Gets around on any ground

Fully-reversing transmission —
4 speeds forward, 4 reverse

Power-boosted, rear-wheel steer

Fulllest operator visibility

Hydraulic power dump

75 H.P. gas or diesel

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on this Model HM or smaller PAY-
LOADERS; the 1 1/4 yd. Model
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This big 1 1/2 yd. HM PAYLOADER with its combination of large pneumatic tires and 4-wheel drive gives you fast-action traction on all kinds of footing — on sand, stone, snow, clay or mud. It gives you crawler-like traction at far less maintenance expense, PLUS speed when you want it.

This special tractor-shovel also gives you easy operation and maneuvering speed through power-boosted steering and full-reversing transmission. There are four speeds in reverse as well as forward. Double-acting hydraulic rams raise and lower the booms . . . dump and close the bucket . . . exert tons of down-pressure for tough digging conditions.

See a Model HM in action and you'll know why quarry and pit operators are buying this big, husky tractor-shovel for loading trucks, feeding hoppers and conveyors, stripping overburden, doing clean-up and stockpile work, spotting cars, shifting track, maintaining haul roads and doing many other jobs. The Frank G. Hough Co., 735 Sunnyside Ave., Libertyville, Illinois.



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SIMPLEX RATCHET LOWERING JACKS



• These rugged, easy operating Simplex Ratchet Lowering Jacks speed mine jacking . . . and insure greater safety. Proved and used in every type of mine, Simplex Jacks can be depended upon to step up efficiency; to cut time and costs on lifting, lowering, leveling and other jacking jobs.

Every Simplex Ratchet Lowering Jack is built to lift full rated capacity on cap or toe. Each guarantees maximum service with these features:

Double lever sockets—Extra strong, adjustable spring mechanism—Shorter Fulcrum centers—Large Trunnion bearings—Reinforced, inner-ribbed housings.

No. 86A—FOR THICK SEAMS

8 Tons capacity—20" high—12" lift. For coal cutting and loading machines, rearing mine cars and light locomotives, shop, track work, etc.

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5 Tons capacity—17" high—10" lift. For locations where more limited height and lift are required. Combines maximum strength with minimum weight.

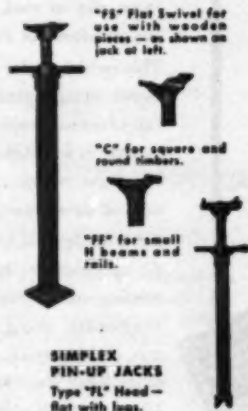
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5 Tons capacity—Weights only 20 lbs.—14" high—2" lift. For easy handling and operation in cramped quarters.

THE COMPLETE SIMPLEX LINE OF MINE JACKS
also includes—Mine Timber Jacks, Post Pullers, Hydraulic Jacks, Cleared Jacks, and Anchor Jacks. Send for Bulletin: Mines 47 and Mines 48

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Type "FL" Head—
Rat with lugs.

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LEVER SCREW HYDRAULIC
Jacks

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COMING MEETINGS

1951 COAL BRIQUETTING CONFERENCE: Aug. 2-3, Superior, Wis., sponsored by the Natural Resources Research Institute, Laramie, Wyo.

CENTRAL PENNSYLVANIA COAL PRODUCERS' ASSOCIATION and EASTERN BITUMINOUS COAL ASSOCIATION: annual meeting, Sept. 26-27, Bedford Springs Hotel, Bedford, Pa.

NATIONAL FIRST-AID AND MINE-RESCUE CONTEST: Oct. 2-4, Columbus, Ohio.

JOINT FUELS CONFERENCE, AIME Coal Division and ASME Fuel Section: Oct. 10-11, Hotel Roanoke, Roanoke, Va.

THIRTY-NINTH NATIONAL SAFETY CONGRESS AND EXPOSITION: Oct. 8-12, Stevens, Palmer House, Congress and Morrison Hotels, Chicago, Ill.

ILLINOIS MINING INSTITUTE: annual meeting, Nov. 2, Hotel Abraham Lincoln, Springfield, Ill.

POCAHONTAS ELECTRICAL & MECHANICAL INSTITUTE: Nov. 26, Bluefield, W. Va.

Bureau of Mines laboratory in Pittsburgh, that mine may not bid on government coal-purchase contracts, according to H. P. Greenwald, U.S.B.M. regional director.

Coal Still First In Home Heating

Nearly half of the Nation's more than 20,000,000 dwelling units with central heating are kept warm with coal, according to figures gathered in the 1950 census. The total of centrally-heated homes using coal is 9,430,000. An additional 5,127,000 dwelling units not heated centrally also use coal. Gas and oil, though running neck and neck for second place, are far behind coal, the data show. Much of the gas burned in homes is manufactured gas.

Three Groups Seek Gas From Anthracite Bone

Three organizations soon will start up a pilot plant to determine whether commercial-grade gas can be made economically from anthracite bone. Millions of tons of bone waste now are piled high in the anthracite region. The organizations are the U. S. Bureau of Mines, working through the Anthracite Research Laboratory; Anthracite Institute; and Wellman Engineering Co., New York City.

The research teams will use a Wellman-Galusha gas producer now installed in a commercial plant at Wilkes-Barre. The Bureau and Anthracite Institute will provide most of the supplemental equipment and

Trouble-free Dust Control



SIMPLIFIED DUST-PROOFING WITH PERMATREAT SAVES TIME AND LABOR

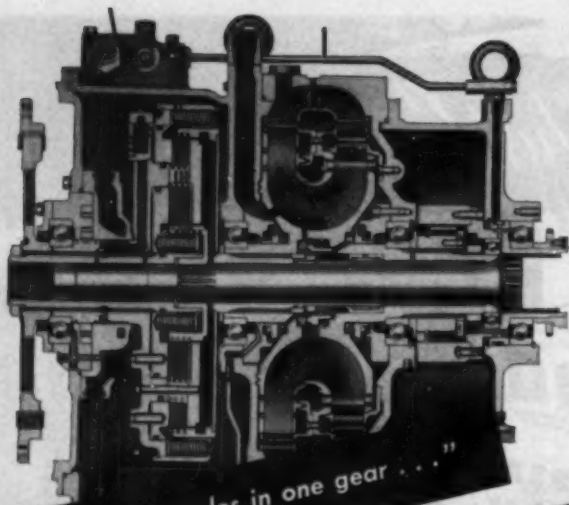
Mine operators, both large and small, have found that PERMATREAT is the simplest, most economical method of controlling dust. Since PERMATREAT is free-flowing summer or winter and has amazing spreading characteristics, maximum coverage is obtained with minimum quantity of oil. PERMATREAT coal spray is particularly effective with washed coals. It speeds up de-watering, thus giving more uniform control of moisture content. Oil treating minimizes degradation in transit and under storage conditions, and provides an easier-handling, cleaner fuel.

With strategically located refineries and river terminals, PERMATREAT COAL SPRAY can be supplied economically to Eastern and Central bituminous coal fields. An Ashland field representative will be glad to call on you and recommend the correct grade of oil for treating your specific kind of coals.



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Ashland, Kentucky



"Takes 13% grades in one gear . . ."

"Lets the engine do 90% of the braking . . ."

"Substantial savings on axles, tires and brakes . . ."



Model DF Twin Disc Hydraulic Torque Converter

"Field reports of the Twin Disc Three-Stage Hydraulic Torque Converter with Direct Drive feature, in big heavy-duty trucks, are proving that 99% of forward gear shifting can be eliminated in off-highway operation. Extensive tests on the Mesabi Iron Range in this Twin Disc equipped Dart truck indicate that these converters can significantly reduce time on hauling cycles on this, probably the world's toughest trucking, with loads up to 30 tons and grades up

to 13%. Furthermore, very substantial savings on axles, tires, gears and brakes are reported."

That is the first paragraph from a just-published four-page bulletin on the new Twin Disc Model DF Three-Stage Hydraulic Torque Converter.

You'll want the complete story because never before have so extensive tests been reported on three-stage hydraulic torque converters with an *in-built* braking feature which no other torque converter can claim. Write today, and be sure to ask specifically for Bulletin No. 162. It may show you how to save thousands of dollars in truck operation.

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES



TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, BOSTON, MINN.

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EQUIPMENT APPROVALS

Nine approvals of permissible equipment were issued by the U. S. Bureau of Mines in June, as follows:

Joy Mfg. Co.—Type WK83R Model 175 air compressor; one 40-hp motor, 250 v, dc; Approval 2-789; June 1.

Goodman Mfg. Co.—Type 660-C tractor tread loader; two 50-hp motors, 220 and 440 v, ac; Approvals 2-790 and 2-790A; June 4.

Goodman Mfg. Co.—Type 665-C tractor tread loader; two 50-hp motors, 220 and 440 v, ac; Approvals 2-791 and 2-791A; June 4.

Huwood-Irwin Corp.—Type 5-hp conveyor power unit; one 5-hp motor, 230 v, dc; Approval 2-792; June 8.

Joy Mfg. Co.—Type WK83R Model 240 air compressor; one 50-hp motor, 220 v, ac; Approval 2-793; June 14.

Joy Mfg. Co.—Type WK83R pneumatic drilling machine; one 50-hp motor, 220 v, ac; Approval 2-794; June 14.

Ingersoll-Rand Co.—Type 534 "Impactool" impact wrench; one 1½-hp motor, 250 v, dc; Approval 2-795; June 20.

Goodman Mfg. Co.—Type L-20 shaker conveyor; one 20-hp motor, 440 v, ac; Approval 2-796A; June 22.

J. H. Fletcher & Co.—Tram roof drill; one 7½- or 10-hp motor, 250 v, dc; Approval 2-797; June 27.

will gather and analyze data from the tests.

Operating crews will come from the three cooperating organizations from anthracite-producing companies and Pennsylvania State College.

Set Date for W. Va. Mine Safety Meet

The West Virginia mining safety meet has been scheduled for September 22 in Charleston, according to recent announcement by Arch J. Alexander, chief, Department of Mines & Minerals. Twenty-four mining first-aid teams will compete for top honors.

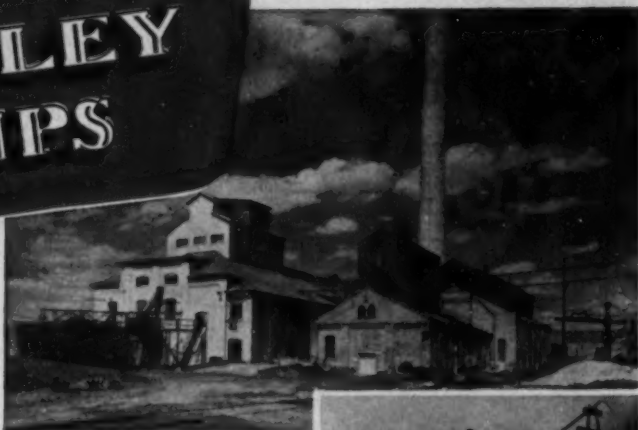
Contestants in the state-wide meet will be the winners of first, second and third places in eight district contests.

The schedule for the district meets is as follows: Mt. Hope, Fayette County, July 28, Eastern Gas & Fuel Associates, sponsor; Red Jacket, Aug. 4, Red Jacket Coal Corp., sponsor; Mingo County, Aug. 21, Mingo County Mining Institute, sponsor; Webster Springs, Aug. 25, Mid-State Mining Institute, sponsor; Clarksburg, Sept. 1, Central

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Climax URANIUM PLANT



The great CLIMAX URANIUM COMPANY PLANT at Grand Junction, Colorado, built primarily for uranium processing, uses WILFLEY pumps throughout. WILFLEY Model K sand, Model AF acid, and plastic lined acid pumps maintain continuous, trouble-free, high-efficiency performance with leaching solutions, tailings, vanadium and uranium leach liquors, dilute acids, sand slimes, roaster calcine and other chemical solutions. Individual engineering on every application. Buy WILFLEY for lower production costs. Write or wire for details.



Plastic Lined Pumps in Tank House. These acid-proof pumps receive vanadium and uranium leach liquors from leaching tanks and pump them to various treatment tanks located in the main portion of the building.



Grind Circuit Circulation Model K Pumps. These sand pumps receive the classifier overflow and pump the material to the sand slime separation circuit located at a higher elevation.

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STEEL TIES



SAVE MONEY
SAVE LABOR
SAVE WEIGHT

West Virginia steel ties are of standard design and unique, especially designed to meet the heaviest service that modern mining machinery and equipment impose. One piece in construction, with no separate parts to be fast, they are convenient to handle and easy to install. Write today for descriptive literature.



RAILS—In ASCE sections and any lengths, high quality rail steel for durability.

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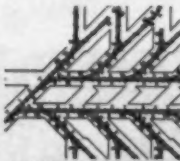
Due to material shortages and present heavy demand, prompt delivery is not always possible.



SWITCH STANDS—Tops in design, tops in service, tops in quality and variety.



TURNOUTS—Economical in use, economical in cost, easy to install and maintain.



PREFABRICATED TRACK—Made to exact specifications for easy handling, easy installation at substantial savings.



ROOF BOLTS—The greatest forward step in safety and economy in mining in years.

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Virginia Steel & Mfg. Co.
Huntington, West Virginia



Manufacturers of
RAILS and ACCESSORIES
TRACK WORK
STEEL TIES

West Virginia Mining Institute, sponsor; Whitesville, Sept. 1, Coal River Mining Institute, sponsor; Mannington, Sept. 8, Northern West Virginia Mining Institute, sponsor; and Morgantown, Sept. 15, Monongahela Valley Mining Institute, sponsor.

Safety Council Set Up In Tri-State Area

Formation of the Tri-State Safety Council to stimulate study of industrial accident prevention and the exchange of safety ideas and "know-how" was announced last month by Frank J. Foresman, personnel director of the Pittsburg & Midway Coal Mining Co., Pittsburg, Kan., and president of the new organization. Members include representatives of various mining companies, industries and businesses in Kansas, Oklahoma and Missouri.

The council will meet regularly the second Monday evening of each month in the auditorium of the Jayhawk works of the Spencer Chemical Co., 20 mi south of Pittsburg. The meeting will feature presentation of safety stunts, ideas, information and other material that can be utilized by council members in their own safety programs. The organization also plans to cooperate with local safety councils in promoting accident-prevention education. John E. Smith, safety director, Spencer Chemical Co., is first vice president and program chairman.

Warriner Retires From Anthracite Peace Board

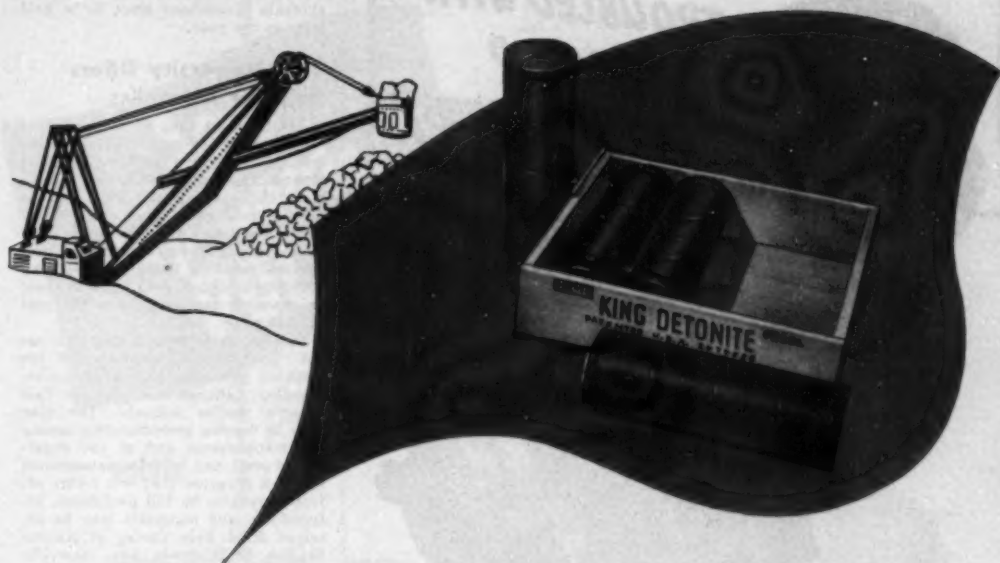
Jesse B. Warriner, senior director, Lehigh Navigation Coal Co., retired June 29 as a member of the Anthracite Conciliation Board after 25 yr of service. At the time of his retirement, he was senior member and chairman of the group. He was one of the original members of the Anthracite Producers' Advisory Board and for many years served on the Anthracite Operators' Wage Agreement Committee. He will continue as senior director of his company.

Westmoreland Coal Co. Team Cops Safety Honors

A team from the McCullough mine, Westmoreland Coal Co., won first place with a perfect score in the 4th annual first-aid contest of the Westmoreland County Safety Association held June 23 at Latrobe, Pa. The top team won a Mine Safety Appliances Co. plaque and a purse of \$200.

Second place was won by a team from Bowman mine, Bowman Coal Co., with a score of 99.733. Second-place awards were a National Coal Association plaque and a \$100 purse. A tie developed for third place but the toss of a coin threw the decision with its \$120 purse to team from Salem mine. Atlantic Crushed Coke Co. Loser in the

STRIP MINERS:



KING STRIP DETONITE gives better overburden breakage!

KING STRIP DETONITE is the *patented* stripping explosive that shoots overburden with the greatest economy. Proved by fifteen years of continuous use, an ever increasing number of alert operators are benefiting by its adoption. They know that Detonite produces *better* fragmentation without damaging the coal. They get faster, more continuous shovel operation, and move more yardage at less cost per ton. You TOO, will . . .

Profit from a Detonite demonstration!

A demonstration will show you why more and more strip mining operations are switching to King Detonite—the one high explosive that makes easy digging out of hard-to-shoot overburden. We will be glad to demonstrate King Detonite on your property, at your request. Contact your King Representative or phone or write us direct. You'll profit by arranging for that demonstration, today!

DETONITE

THE PATENTED SURFACE-SENSITIZED HIGH EXPLOSIVE



THE KING POWDER CO.
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INCORPORATED 1878



In MORRIS

Type R Slurry Pumps

**SUCTION LIFT HELPS
REMOVE OBSTRUCTIONS!**

A Morris Type R is capable of operating under suction lift . . . positive head not required! This design feature lets atmospheric pressure do its work — and in many instances it's sufficient to clear the stoppage. Shutdowns and dismantling of pipe lines are greatly reduced.

And when there are cases calling for pump dismantling, the job is relatively simple with Morris Type R. By loosening four bolts, off comes the end cover — and you can take a quick look at the inside. Unscrew the impeller, if necessary. But you don't have to disturb the pipe line at all.

Small wonder Morris Type R is so popular in coal conditioning operations. Flow is maintained so reliably with slurries of all consistencies that a lot of operating problems are answered. Get the full story of this many-feature pump. Write for Bulletin 181.

MORRIS MACHINE WORKS Baldwinsville, N.Y.

Branch Offices in Principal Cities

MORRIS

Centrifugal Pumps

cointossing and therefore fourth-place winner was a team from Carpenter-town Coal Co. The four teams will represent the association in the Pennsylvania bituminous meet to be held later in the year.

**Yale University Offers
Help for Alcoholics**

Pointing out that an average of 4 out of every 100 employees in American industry are problem drinkers representing an actual money loss to their employers and a weak link in defense production, the Center of Alcohol Studies, Yale University, now makes available to companies a plan for dealing with the problems of alcoholism in industry. The plan is based on research extending over the past several years.

Problem drinkers and alcoholics are not "Skid Row" characters but are diseased persons who need understanding, patience and help, the Yale group's studies indicate. The plan aims to develop understanding among top management and at the supervisory level and to help management set up a program that will return affected workers to full usefulness. Information and materials may be obtained from Yale Center of Alcohol Studies, 52 Hillhouse Ave., New Haven 11, Conn.

**Lots of Jobs for Mining
Graduates, Walker Says**

"Graduates in mining engineering need not fear their jobs will run out," Harold L. Walker, head, Department of Mining and Metallurgical Engineering, University of Illinois, recently told a group of alumni and students. He said there are more positions open for mining-engineering graduates than there are men to take them. Salaries also are good, he said, pointing out that recent graduates who held 30 undergraduate scholarships now are earning from \$3,600 to \$4,800 per year.

**Court Upholds Union
Intimidation Verdict**

Circuit Judge Harold F. Snead, Richmond, Va., upheld June 27 a lower court's finding that the UMWA and its affiliates, UMWA District 50 and the United Construction Workers, were guilty of intimidation in forcing construction workers to stop work in Breathitt County, Ky., in Dec., 1949. Judge Snead's ruling ordered judgement for \$275,437 against the union and its affiliates in favor of Laburnam Construction Co., Richmond.

The company had charged that a mob of 75 to 100 men appeared at the project and forced AFL union members to leave their work. The company was compelled to cancel its contract for a coal-preparation plant and 25 dwellings for Pond Creek Pocahon-

**Save
Top Carrier
ROLLS**

with

Don't throw top carrier rolls away! They're too hard to get these days. When the tractor is down for repairs to track, sprockets, idlers or rollers—rebuild top rolls with Stoodly 1027.

Stoodly 1027 gives longer service, resists the wearing of flat spots when rolls freeze up with mud. Rolls should be rebuilt before too serious wear occurs.

See your Stoodly dealer . . . or write for folder on welding procedure for top carrier rolls.

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THE ATLAS CAR & MFG. CO.

tas Coal Co., Huntington, W. Va. The UMWA contended that the workers left their jobs out of respect for picket lines. Judge Sneed's decision confirmed a jury finding that the men left their jobs because of terrorism.

Stoker Manufacturers Hold Annual Meet

Stress on sales power and greater effort as a means of bringing sales volume up to profitable levels was the major theme at the 34th annual meeting of the Stoker Manufacturers' Association, June 25-26, at Lake Wawasee, Ind. Makers of nearly all types of stokers and supply and allied firms, together with representatives of anthracite and bituminous companies and technical and research organizations, attended the meeting.

Stoker sales executives agreed that sales power at both retail and manufacturing levels needs strengthening and that bigger promotional efforts are needed to push sales upward.

Featured also at the two-day meeting was a discussion of government controls affecting the stoker industry. Representatives of government agencies were on hand to answer questions.

Major speakers were: Julian E. Tobey, president, Appalachian Coals, Inc., Cincinnati; J. C. Harkness, A. T. Kearney & Co., Chicago; Dr. R. C. Johnson, vice president, research, Anthracite Institute; and E. B. Priest, field representative, Bituminous Coal Research, Inc., Pittsburgh.

Incumbent officers were re-elected as follows: president, C. T. Burg, Iron Firemen Mfg. Co., Cleveland; vice president, L. C. Dubs, Canton Stoker Corp., Canton, Ohio; secretary-treasurer, T. A. Crawford, Timken Silent Automatic Div., Timken-Detroit Axle Co., Detroit; executive secretary, Marc G. Bluth, Chicago.

Pioneer Safety Miners Win Holmes Awards

Twenty-two members of the Pioneer Safety Miners Club, Bluefield, W. Va., have been awarded Certificates of Merit by the Joseph A. Holmes Safety Association. The certificates will be presented at the 1952 reunion of the old timers in Bluefield, at the time of the Southern Appalachian Industrial Exposition.

Records show that the 22 men have worked a total of 1,188 yr without lost-time accident. Their ages total 1,609 yr.

Names of the award winners with length of time without lost-time accident are:

Pocahontas Fuel Co.—J. C. Baldwin, Bluefield, 56 yr; C. T. Davis, Pocahontas, Va., 62 yr; A. Dawson, Pocahontas, Va., 55 yr; Thomas Lowe, Montcalm, W. Va., 53 yr; and A. C. Nelson, Boiessevain, Va., 65 yr.

West Virginia Coal & Coke Co.—C. A. Coater, Omar, W. Va., 52 yr.
Eastern Gas & Fuel Associates—

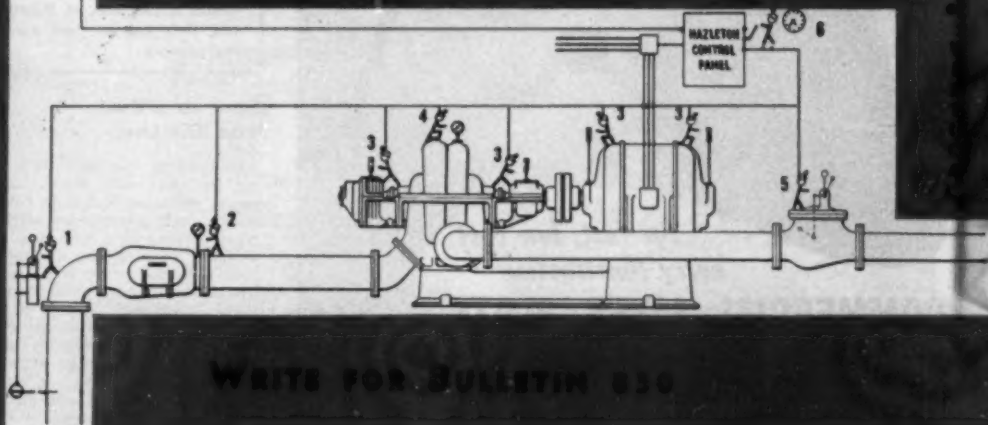
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PROVIDES:

1. PUMP LEVEL CONTROL—START, STOP, HIGH WATER ALARM.
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3. PROTECTION AGAINST OVERHEATED PUMP AND MOTOR BEARINGS.
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CONTROL FOR ANY INSTALLATION—HORIZONTAL



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Job-fitted to your present Plant facilities

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John Dillard, Maitland, W. Va., 53 yr; Sam Gullion, Bluefield, 58 (died May, 1951); and W. D. Tyree, Kimball, W. Va., 51 yr.

New River & Pocahontas Consolidated Coal Co.—T. K. Hess, Newhall, W. Va., 52 yr.

Winding Gulf Collieries Co.—A. L. Justice, Coal City, W. Va., 55 yr; and J. H. Valentine, Winding Gulf, W. Va., 50 yr.

Vera Pocahontas Coal Co.—Joe Madison, Landgraft, W. Va., 49 yr.

Arlington Coal Co.—William Norriss, Caretta, W. Va., 63 yr.

American Coal Co. of Allegany County—E. O. Ring, Lashmeet, W. Va., 41 yr.

Turkey Gap Coal & Coke Co.—J. D. Rockwood, Rock, W. Va., 51 yr.

War Ridge Coal Co.—George L. Smith, War, W. Va., 52 yr.

Glogora Coal Co.—J. E. Wysong, Montcalm, W. Va., 52 yr.

Others, without company names given, are: S. Rutherford, Warrior-mine, W. Va., 55 yr; James G. Smith, Excelsior, W. Va., 52 yr; Tom Tipton, Valls Creek, W. Va., 53 yr; and J. A. Wilson, East Beckley, W. Va., 58 yr.

Retraction

Coal Age wishes to retract the statement made in the article entitled "Shooting With MS Connectors," in the June, 1951, issue, to the effect that British patents cover the Primacord-MS delay connectors in use at Maumee Collieries Co. mines. This is an erroneous statement. The fact is that the Primacord-MS delay connector is a development of E. I. du Pont de Nemours & Co., Inc., of Wilmington, Del., and du Pont patents are pending.

Seek to Offset Iran Oil Loss

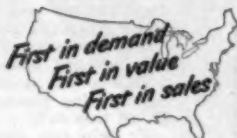
Oil-industry representatives speaking for 19 United States oil companies operating in foreign fields and markets told government officials in Washington July 9 how they expect to offset possible loss of production from wells and refineries in Iran. The Iranian government recently nationalized the Anglo-Iranian Oil Co., a British controlled organization that developed the oil fields in Iran and built the world's largest refinery at Abadan.

Although details of the plan were withheld pending approval by the Petroleum Administration for Defense and the Department of Justice, the proposal in general called for stepping up production and refining in all major foreign oil fields to capacity, as well as international cooperation in improving transport efficiency and laying out the shortest possible routes

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TWO GREAT VALVE-IN-HEAD ENGINES—the 105-h.p. Loadmaster or the 92-h.p. Thriftmaster—to give you greater power per gallon, lower cost per load • POWER-JET CARBURETOR — for smooth, quick acceleration response • DIAPHRAGM SPRING CLUTCH—for easy-action engagement • SYNCHROMESH TRANSMISSIONS—for fast, smooth

shifting • HYPOID REAR AXLES—for dependability and long life • NEW TORQUE-ACTION BRAKES—for light-duty models • PROVED DEPENDABLE DOUBLE-ARTICULATED BRAKES—for medium-duty models • NEW TWIN-ACTION REAR BRAKES—for heavy-duty models • NEW DUAL-SHOE PARKING BRAKE—for greater holding ability on heavy-duty

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 4. **Always Available** — when cylinders are empty, you get new ones immediately . . . no waiting for cylinders to be filled.
- Moreover, if you move, one of Airco's nation-wide network of dealers and plants will always be near for service.

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for oil cargoes. Stewart P. Coleman, a director of Standard Oil Co. (N. J.), said the group hoped that the proposals could maintain adequate oil supplies to friendly nations that formerly depended on Iranian oil for 20% of their needs. He foresaw no imminent reduction in quality or quantity for the United States but indicated that reduction of octane ratings might be one way to stretch supplies to Western Europe, Africa and Asia.

TVA Steam Plants Boost Coal Markets

Tennessee coal operators are looking hopefully at the potential market for 10,000,000 tons per year in new steam generating plants of Tennessee Valley Authority. TVA's new Johnsonville plant alone will use about 2,500,000 tons annually and other plants being planned will use over 25,000 tons daily.

To help coal operators meet the growing demand, the Tennessee Department of Conservation is setting up exploration and advisory crews to locate new coal seams and expand old mines. TVA engineers will work with the survey groups.

East Coast Plants Switch to Coal

The switch from oil to coal along the Atlantic Seaboard because of the growing defense program and the possible cut-off of Iranian oil will mean a 20,000,000-ton increase in coal use, according to H. C. Birkhead, vice president, Pennsylvania Coal & Coke Co. Mr. Birkhead's views recently were revealed in an interview published in the New York World Telegram & Sun.

The changeover to coal among electric power plants and other industrial users will free 80,000,000 bbl of oil and will result in considerable savings to coal customers, he said.

Commenting on the industry's future, Mr. Birkhead said the mines can produce up to 650,000,000 tons per year with existing facilities, if called upon. Mechanization, together with growing market demand, is the reason why his company now is operating "in the black," he explained.

New Books for Coal Men

What Causes Deaths In Anthracite Mines

Why Men Were Killed in Pennsylvania Anthracite Mines in 1950, by J. J. Forbes and H. F. Weaver. U. S. B. M., I. C. 7609. This booklet can help you plan your accident-prevention program and provide your safety men and supervisors with information that will boost their effectiveness. Fa-

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BUILDING MATERIALS

COAL MEN ON THE JOB



BLUE DIAMOND COAL CO., Leatherwood, Ky.—W. E. Wright (left), general preparation foreman; and C. C. Shook, laboratory technician.

tal accidents are described in detail and recommendations are offered. The authors fix responsibility for most of the accidents they describe. 13 pp. 8x 10 1/2-in.; paper; mimeo. Free, Publications Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa.

How the Russians Do It

Underground Gasification of Coal in Post-War Europe. The Russians are reported to be producing 111,000,000 cu ft per hour of 465-Btu gas by underground gasification. This 12,000-word document, translated from Italian scientific journals, tells how the Communists do it. It also describes Belgian and Italian methods. \$15, Accurate Translation Services, Inc., 711 Woodward Building, Washington 5, D. C.

Making Oil From Coal

The Fischer-Tropsch and Related Syntheses, Including a Summary of Theoretical and Applied Contact Analysis, by H. H. Storch, Norma Golumbic and R. B. Anderson. Basic data, techniques, methods and materials for the Fischer-Tropsch process of synthesizing liquid fuels, based on documents captured following World War II in Germany and on research and development in this country and Great Britain since the war. 610 pp. 6 1/2x9 1/4-in.; cloth \$9. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16.

Utilizing Coal

Progress in Coal Science, edited by D. H. Bangham. A report of recent research by the British Coal Utilization Research Association, stressing coal's importance as a fuel and a raw material. Includes chapters on

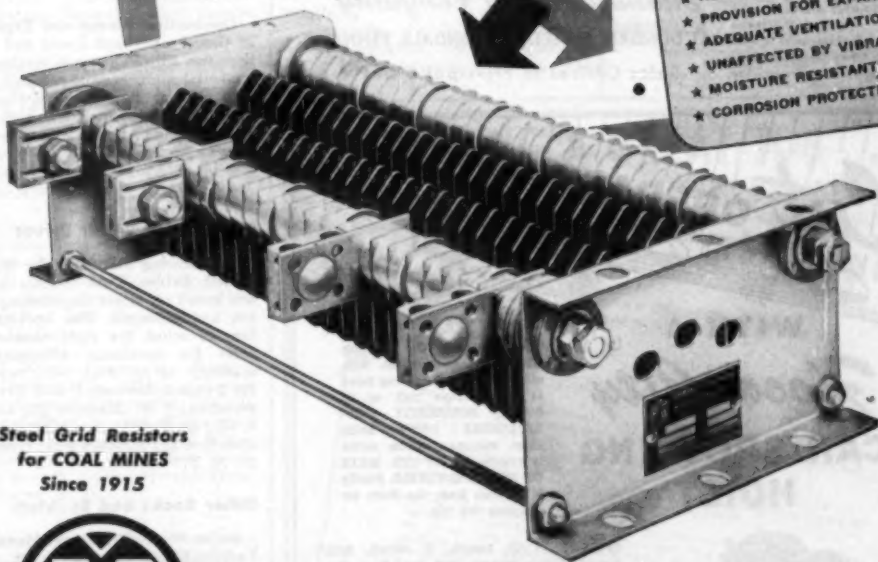
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where conditions may be
Destructive or Hazardous

P-G RESISTORS, with their non-corrosive steel resistor elements and mica insulation, last longer under extremely adverse operating conditions. In addition, P-G exclusive floating bolt provision for expansion and allowance for adequate ventilation provide that "something extra" needed for a truly rugged resistor. Neither vibration, nor moisture laden or corrosive atmospheres have material effect on quality of service.

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for COAL MINES
Since 1915



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Built for long service . . . Shaker Conveyor Troughs and Ball Frames



The special high carbon steel of which Hendrick Shaker Conveyor Troughs are made, offers great resistance to abrasion and to bending or breaking under weight of the coal. The sides of the troughs are so shaped that they give maximum resistance to buckling.

Standard lengths are 10 feet, and 10 feet, 2 inches, but can be furnished in any desired length up to 13 feet, 2 inches.

Hendrick Ball Frames give troughs substantial support whatever the floor conditions. Write for full information.

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Perforated Metals
Perforated Metal Screens
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Architectural Grilles
Milco Open Steel Flooring,
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Sales Offices in Principal Cities

Cut OPERATING TIME

WITH A Flood City CAR SPOTTING HOIST

SPECIFICATIONS: Length, 7'; Width, 29½"; Height, 50½"; Weight, 2195 lbs.; Rope Capacity, 500 ft.—½", 750 ft.—¼". Channel from frame with solid steel bottom . . . completely guarded . . . all parts readily accessible.

The Flood City Car Spotting Hoist features a quiet, self-rolling worm gear reducer rated at 60000# rope pull at 35 ft./min. **INHERENTLY NON-REVERSIBLE DRIVE** holds drum stationary when motor is stopped. **ANY STD. MAKE OF MOTOR IS USABLE.** Sturdy jaw clutch frees the drum for coupling the trip.

FLOOD CITY BRASS & ELECTRIC CO.

JOHNSTOWN, PA. • BRANCH OFFICE: CHARLESTON, W. VA.

experimental techniques, fine particles, coal constituents, organic chemistry of coal products and chemical aspects of combustion and gasification. 480 pp. 6¼x10-in. \$7, Interscience Publishers, Inc., 250 Fifth Ave., New York 1.

More Light—Better Work

Lighting and the Nation's Welfare. Five Sections summarizing present-day lighting services in production, public safety, research, education and government. 24 pp. 6x9-in; paper. Single copies, 25; 100 copies, 15c; 500 or more copies, 10c. *The National Information Committee on Lighting, 1410 Terminal Tower, Cleveland, Ohio.*

Better Cutting Tools

Carbide Cutting Tools, by Warren Baker and J. S. Kozacka. Seventeen chapters on the development of cutting tools, with practical information for designers, engineers and students. 416 pp. Cloth. \$5.50, Educational Training Department, Vascology-Ramet Corp., Waukegan, Ill.

How Gases Burn

Combustion, Flames and Explosions of Gas, by Bernard Lewis and Guenther von Elbe. This new textbook for students, engineers and research workers tell how flames are ignited and propagated. It includes high-speed photographs of flames and explosions. The authors are U.S.B.M. scientists. 800 pp. \$13.50, Academic Press, Inc. 125 East 23rd St., New York City 10.

How to Use V-Belt Drives

Engineering Standards for Multiple V-Belt Drives. Data in this manual are based on latest engineering opinion and research. The booklet tells how to select the right sheaves and belts for maximum efficiency and economy. 16 pp. 8¼x11-in; paper. \$1 for 2 copies, Multiple V-Belt Drive Association, 7 W. Madison St., Chicago 2, Ill.; or Rubber Manufacturers Association, 444 Madison Ave., New York 22, N. Y.

Other Books and Booklets

Boiler-Water Treatment Manual for Federal-Plant Operators, by Louis Goldman. U.S.B.M., Handbook 5. 94 pp. 5¼x9¼-in; cloth. 30¢, Supt. of Documents, Government Printing Office, Washington 25, D. C.

Methods of Analyzing Coal and Coke, by A. C. Fieldner and W. A. Selvig. U.S.B.M., Bulletin 492. 51 pp. 8x10¼-in; paper. 50¢, Supt. of Documents, Government Printing Office, Washington 25, D. C.

Geology of the Eastern Part of the Centralia-Chehalis Coal District, Lewis and Thurston Counties, Wash-

COAL MEN ON THE JOB



HUTCHINSON COAL CO., Melville No. 11 mine, Stallings, W. Va.—Night shift: Standing—C. F. Vincil (left), Luther Wheeler and Kermit Toney, section foreman. Seated—Jess Carter and A. E. Monk, section foremen; and J. H. Meade, night foreman.

ington, by P. D. Snavey Jr., A. E. Roberts, Linn Hoover Jr. and M. H. Pease Jr. Map C8, Coal Investigations Series. Two sheets. 75¢ per set, Distribution Section, Geological Survey, Denver Federal Center, Denver, Colo.

Estimate of Known Recoverable Reserves of Coking Coal in Pike County, Ky., by James Dowd, L. A. Turnbull, A. L. Toenges, R. F. Abernethy and D. A. Reynolds. U.S.B.M., R.I. 4792. 8x10½-in; paper; mimeo. Free, Publications Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa.

Analysis of Haulage Fatalities in Bituminous Coal Mines in 1950, by M. J. Ankeny and D. S. Kingery. U.S.B.M., I. C. 7604. 8x10½-in; paper; mimeo. Free, Publications Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa.

Coal Mines Committee, International Labor Office. Three volumes: Vol. I, General Report, 75¢; Vol. II, Hours of Work in Coal Mines, 25¢; Vol. III, Productivity in Coal Mines, \$1. International Labor Office, Washington Branch, 1825 Jefferson Place, Washington 6, D. C.

Foreign Developments

AUSTRALIA—Efforts to speed stripping in New South Wales have been signaled by a government request for bids from abroad to provide new or second-hand draglines, shovels, trucks and drilling machines. Aim is to lift Australian stripping output from 1,600,000 to 5,000,000 tons per year by 1953. Elsewhere, in Queensland, business interests have suggested that foreign companies be urged to help in developing stripping

properties near Bowen. Cost would be about £15,000,000. Queensland coal would be the basis for steel-industry expansion and possibly for production of synthetic liquid fuels if practicable.

Meanwhile, the Joint Coal Board has recommended complete reorganization and re-equipment of the coal



THE MERRICK FEEDOWEIGHT

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tells rate per hour
—weight per day

A self-contained automatic surveyor scale, combined with automatic gate to give feed rate control. Powered feed regulator operates gate, without restraint on scale beam. Feed rate may be varied. Large feed opening insures even flow. Uniformly feeds bulk material BY WEIGHT! and automatically indicates weight of materials fed. Durable. Simple to operate. Rugged, heavy duty design. Slow moving parts means long life. Easy to install and maintain.

Manufacturers of
The Merrick WEIGHTRONER, which weighs any material carried on a belt conveyor without interrupting conveying operation. Complete descriptive matter on request.

MERRICK SCALE MFG. CO.

Engineers and Mfrs. of Automatic Weighing Equipment

PASSAIC, N. J., U. S. A.

"DOING A GREAT JOB . . . WE'RE MORE THAN SATISFIED"

This letter is typical of the many received from satisfied Gundlach Crusher owners.

READ IT!

BARBARA-KAY COAL COMPANY
MARION, ILLINOIS

J. Gundlach Machine Company,
Belleville, Illinois.

Gentlemen:

June 9, 1951

You can quote us as pleasantly surprised to find that the Gundlach Coal Crusher so far outdoes in actual performance the generous promises made by your representative.

The convenience of being able to reduce Wise Run to Stoker Coal in one handling operation in a single compact space-saving machine is paying us healthy dividends daily in savings of time and labor.

Our maintenance engineer reports that the easy accessibility of all bearings for lubrication and general maintenance is a definite economy factor. Out in the yard, the foreman has commented on the savings in time and handling through being able to change coal sizes without interrupting the crusher's operation. He draws attention as well to the very small percentage of waste. The Gundlach Crusher came to do its job in a clean efficient manner, reducing wasteful pulverization to a minimum.

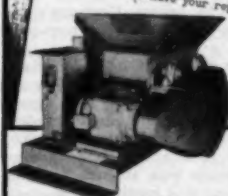
Please have your representative drop in on us on his next trip our way.

Very truly yours,

Barbara Kay

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T. J. GUNDLACH Machine Co.
BELLEVILLE, ILLINOIS



RECLAIM YOUR SLURRY !

To go "all out" for COAL Production, reclaim your SLURRY Coal—No other means will accomplish this more economically than a C·M·I CENTRIFUGAL COAL DRYER !



Write or Wire! Let us
tell you all about it.
No obligation, of course.

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INDUSTRIES**

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industry to raise deep-mine output to 13,300,000 tons by 1953. Production in 1950 was 11,198,000 tons. The board already has spent large sums overseas for deep-mine and strip machines and for cleaning facilities.

A six-unit Lurgi gasification plant for brown coal operating at 400 psi soon will be installed at the Morwell briquetting plant 85 mi from Melbourne. The high-Btu gas will be piped to Melbourne. Future plans call for six more units for Fischer-Tropsch production of synthetic liquid fuels.

GREAT BRITAIN—An explosion 900 ft underground in a mine at Easington, near England's northeast coast, took the lives of 80 miners and one rescue worker May 29. The explosion took place in a winding tunnel 1 1/4 mi from the shaft bottom. It was the worst mine disaster since Britain nationalized the mines in 1947.

Thirty Italian workers who volunteered for underground jobs in Britain recently arrived at London. They are the first group to arrive under an agreement between the National Coal Board and the British mineworkers' union. The agreement provides that they will remain in coal-mine jobs, be paid prevailing wages and become members of the union. They are being admitted for a 2-yr trial period. The new workers will be trained at an NCB center before entering the mines.

Britain's first heavy-media coal preparation plant, using the Ridley-Scholes process, went into production at mid-June at Chislet Colliery, Kent. Capacity is 220 tph of raw coal.

A plan for decentralizing control of the coal industry under the National Coal Board has been submitted. The plan, supported by two former members of the NCB, urges confinement of the NCB authority to broad policy and financial control and regrouping of mining operations into 30 autonomous districts instead of the present 48 subordinate areas. The present centralized system is charged with creating confusion and frustration among local mine managers.

GERMANY—A strike of 400,000 Ruhr miners was averted July 3 when miner representatives accepted a 12% wage boost retroactive to May. The government meanwhile is studying plans for increasing production to meet urgent foreign and domestic needs. It is estimated that the third-quarter shortage will reach 3,000,000 tons. For that reason, the government has asked the International Ruhr Authority to reduce Germany's export quota or permit an export-price increase.

To ease the mine-timber shortage, the Coal Mining Administration and the Pit-Prop Association have agreed on a coal bonus for timbers supplied. The plan calls for delivery of 3,000,000 cubic meters of timber against 150,000 metric tons of coal. The timber producer will receive a coal-quota

ENSIGNER Controls

*Provide
Safety*

on belt conveyors.

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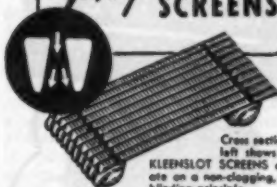
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ticket in exchange for pit props he delivers to the mine. He can exchange the ticket for coal.

Ruhr industrialists say they are being forced to export so much coal that they have to buy back their own fuel at nearly three times the original cost to run their plants. A six-nation authority, including the United States, tells the Germans how much they must export, where they must send it and how much they must charge for it. Germans complain they ship out 6,200,000 tons of coal every quarter at a price of \$10.23 per ton and buy part of it back at \$28.57. The Ruhr district recently has had to import some 700,000 tons of American coal at a price of \$20.

GENEVA—The coal committee of the United Nations Economic Commission for Europe has failed to agree on a program for the next quarter because of the unwillingness of German coal producers to provide coal for allocation by the commission. Most of Germany's export coal now is sold under trade agreements. Recipient countries that receive coal under these agreements also are unwilling to cede part of their coal to other coal-shor* countries.

FRANCE—French coal and coke imports for 1951-52 may fall 4,000,000 tons short of the planned 14,000,000 tons. The government has urged United States and international coal-allocation bodies to seek ways to improve shipments to France.

CANADA—Dominion Steel & Coal Corp. has approved \$16,000,000 capital expenditures in the third stage of the company's program of modernization and expansion. First stage of the program, now nearing completion, includes mining and preparation machinery to feed the steel plant at Sidney, Nova Scotia.

Central Appalachian AIME Scans Mining

Begins on p 130.

Central Appalachian Section, A.I.M.E., June 15-16.

John T. Parker, superintendent, Inland Steel Co., Wheelright, Ky., chairman of the Central Appalachian Section, directed the meeting. Session chairmen were: A. R. Matthews, president, Clinchfield Coal Corp., Dante, Va.; R. W. Storey, chief engineer, Consolidation Coal Co. (Ky.), Jenkins, Ky.; and Paul H. Price, West Virginia state geologist. Earl B. Morris, dean, School of Engineering, Virginia Polytechnic Institute, Blacksburg, Va., spoke at a luncheon presided over by Mr. Parker. E. R. Price, manager of coal properties, Inland Steel Co., Wheelright, Ky., was toastmaster at the banquet and H. L. Donovan, president, University of Kentucky, Lex-

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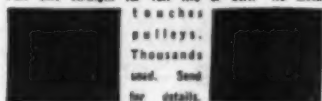


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COAL MEN ON THE JOB



HUTCHINSON COAL CO., Melville No. 11 mine, Stollings, W. Va.—Day shift: Standing—Robert Jeffray (left), section foreman; James Price, slate foreman; H. B. Fleenor, tipple foreman; and E. R. Cantley, superintendent. Seated—V. Bailey, section foreman; R. S. Quinn, assistant foreman; John Saunders and Charlie Cline, section foremen; and Jess Nelson, mine foreman.

ington, was the banquet speaker.

Waste water is processed so that it has a "no-coal" look at a southern West Virginia mine, said E. R. Carris, assistant to the president, Roberts & Schaefer Co. Describing the plant, Mr. Carris noted that approximately 54c per ton is the total cost of treating the water and recovering 48-mesh coal that sells for \$4.75 per ton. The flotation has been added to a plant that cleans 75 tph of $\frac{1}{2}$ x0 and includes a Hydrotator, classifier separator, CMI dryer and Raymond flash dryer.

Flotation, without previous desliming, is done in a 6-cell Denver Sub-A unit rated at 10½ tph of dry solids. In this unit, the refuse from the first cell is re-treated in the second, the refuse from the second re-treated in the third, and so on. A third vacuum filter of six 6-ft disks is being added to the plant because the two original filters of that size lack capacity to handle 10½ tph. They should have been the 8-disk size. The third 6-disk unit will provide flexibility and allow for greater tonnage.

For the 48-mesh x 0 material being handled at this mine, the maximum filter capacity has been found to be 40 lb of dry solids per hour per square foot of filter cloth. Experiments with copper-mesh cloth indicate that there will be an advantage in substituting that or stainless-steel cloth for the single cotton now used.

Costs per ton of the pine oil and kerosene used in the flotation are 1½c and 3c respectively; total, 4½c. Power, operation and maintenance costs total 29c. The first cost of a comparable flotation plant today is \$6,500 to \$7,000 per ton-hour of capacity.

Auger mining in highwalls, its history and fundamentals, was described

by D. M. Bondurant, assistant professor of mining, School of Mines, West Virginia University (*Coal Age*, June, p 109). Professor Bondurant described Machine No. 4, built by the Grafton Coal Co., the organization that started

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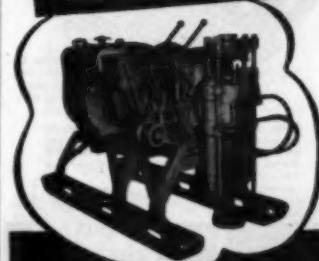
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COAL MEN ON THE JOB



BELL & ZOLLER COAL & MINING CO., West Kentucky Division, Madisonville, Ky.—Herman E. Knight (left photo), division chief engineer; and C. Ward Padgett, division general superintendent, with Stanley Williams, mine manager, and James B. Utley, day surface foreman, Oriole mine, Hopkins County, Ky.

auger mining 3 yr ago (*Coal Age*, June, p 72). Last year Grafton produced over 85,000 tons from two augers. No. 4 machine uses six auger sections boring to a maximum depth of 210 ft. Rigid hexagonal shank and socket couplings and a tripod bearing on one end of each section control the auger so that the holes are drilled practically straight. A 300-hp diesel engine drives the 4-ft auger and a 50-hp engine drives the hydraulic pump and elevating conveyor. A crew of four men operates the machine and the average production, movings included, is 600 tons per shift.

The auger machine weighs approximately 50 tons and requires a pit 65 ft. wide. Holes are drilled one beneath the other, the top holes being drilled first. Overlapping the holes by a few inches appears to save power and improve the percentage of lump.

Maximum practical depth of holes with large augers is thought to be 300 ft. Recovery by Grafton Coal Co. with Machines No. 1 and No. 2 has been approximately 60% as compared to the maximum theoretical of 78½%.

The greatest possibilities for cost reduction lie in direct mining starting where the main line ends, said M. A. Evans, coal operator, Heilwood, Pa. Research is the new approach that must be taken to the problem of meeting coal's competition. Mr. Evans' studies have been based on a division of costs into service and direct mining, the latter including cutting, drilling, shooting and loading.

Developments to produce satisfactory continuous mining machines are evidence of the urge to reduce direct mining costs. But production speeds of continuous mining machines are not the whole answer to cost problems. Low maintenance and ability to meet variable conditions are more important, Mr. Evans said.

There comes a time when further savings at the face are not possible, said M. H. Forester, vice president,

Pittsburgh Consolidation Coal Co., in discussing Mr. Evans' paper. That situation re-directs attention to service cost. The full benefit of continuous miners cannot be obtained in old mines, and it takes new projections and new methods to achieve the lowest possible service costs.

Answering a question from Mr. Price, Mr. Evans said that 30 tons per man is the approximate average, with a range of from 20 to 50 tons, for continuous miners in the soft coals in Pennsylvania.

In further discussion, Valier C. Smith, consulting engineer, Charleston, W. Va., said that research to meet coal's competition should include study of the cost of delivery to the consumer. Low load factor is one of the costly items in coal production. There should be some means of storage at or near the markets to level production at the mines.

Effects of mining contiguous coal beds was the subject of a paper presented by Charles T. Holland, head, Department of Mining Engineering, Virginia Polytechnic Institute. Professor Holland gave a digest of literature and available data dealing with angles of draw, angles of drag, surface subsidence and effects on mining following extraction of other beds. An article on this subject by Prof. Holland appears on pp 89-93 of this issue of *Coal Age*.

Observations on coal mining in Germany were presented by James B. Benson, chief, Norton Branch, U.S. Bureau of Mines. He concentrated on the Ruhr district, where conditions and methods have little in common with those of bituminous mining in the United States. Shafts in the Ruhr are very deep. Many beds are worked, the sequence being from the top down. Back-filling is used to control subsidence. Most of the coal is mined by air picks without the aid of cutting machines or explosives.

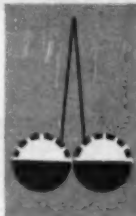
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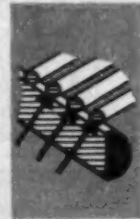
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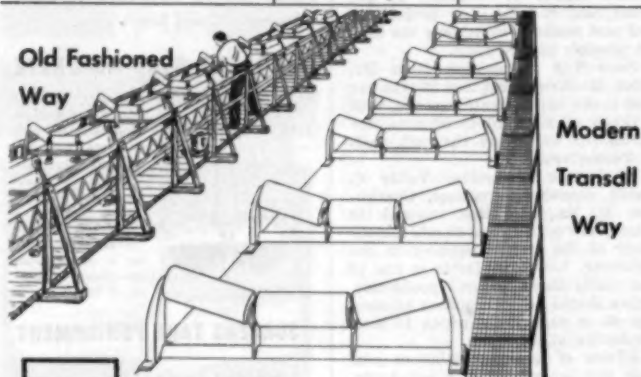
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included two papers not directly pertaining to coal mining. One of these, "Present Status of Exploration for Oil and Gas in Virginia," prepared by W. M. McGill, Virginia state geologist, was read by T. J. Jones, Kentucky state geologist. The other paper, the "Gossan Lead, Carroll County, Va.," was presented in three parts by F. M. Morris and M. V. Corriveau, both associate professors of mining engineering, Virginia Polytechnic Institute; and R. M. Allen, mining engineer, French Coal Co., Bluefield, W. Va.

West Virginia Group Sifts Methods, Problems

Begin on p 132.

cost, operating cost and ease of operation.

3. Problems showing above 10% of near-gravity materials require special handling. The Baum jig at low loading, tables with pre-classified or pre-jigged feeds or with retreatment of middlings, a Hydrotator system involving several stages and the Dutch cyclone are all in the picture.

Current practices in air-cleaning were discussed in a paper by Wm. C. McCulloch, Roberts & Schaefer Co. Mr. McCulloch covered practically the same ground as reported in *Coal Age*, June, p 110. He mentioned 48¢ per ton as the cost of air-cleaning (capital costs and amortization not included) in a 250-tph air-cleaning plant operating on Eagle-seam coal in southern West Virginia.

An average of 84½¢ per ton placed on the haulage and including all movings has been achieved with 12BU loading machines, Piggyback conveyors and flexible-shaft coal drills in Crichton No. 4 mine of the Johnstown Coal & Coke Co., said A. B. Crichton, Jr., vice president. It has been demonstrated that 50% loading time can be achieved and peaks of 85% have been hit. For one month one unit averaged 24.7 tons per man-shift, equal to a face cost of 68¢. The peak production per man-shift has been 53 tons (*Coal Age*, August, 1950, p 105).

Bolting is the first progressive step in roof support since the first wood post was put into a mine, said Arch J. Alexander, chief, West Virginia Department of Mines, in introducing Joseph Bierer, administrative assistant of the department, who presented a paper, "Roof Bolting—Its Growth and Present and Probable Future Effect on Safety in Mines of West Virginia." Although in this state the trial installations of roof bolting started 4 yr ago, as a large-scale experiment bolting is only in its second year. Fatalities from roof falls in the state in 1949 and 1950 were 81 and 92 respectively, compared to an average of 123 per year over the 8 yr previous. Production per fatal roof-

West Virginia Meeting

fall accident averaged 1,394,268 tons per year with large-scale roof bolting, as compared to the average of 990,630 tons per year for the 8 yr preceding roof bolting.

Up to Jan. 1, 1951, the records for the state show that 3,542,131 bolts had been used to bolt 2,870,552 ft of entries and 359,216 ft of rooms. State permits for roof bolting have required bolts $\frac{1}{2}$ in or larger and 81% of the permits issued specify 1-in bolts or 1-in upset with wedge-type anchor. Bolts of $\frac{1}{2}$ -in diameter (expansion chuck anchorage) used with standard timbering have been doing a good job and permits are now to be issued for their regular use.

Permission to use dry dust collectors in connection with roof drilling has been asked of the Bureau of Mines by the Joint Industry Safety Committee, said James Westfield, chief, Accident Prevention and Health Division, Region VIII, in a paper read by Floyd Anderson, also of the Bureau of Mines. This would involve a revision of the Federal Mine Safety Code. The paper was first presented at the Lexington meeting of the Mine Inspectors' Institute of America (*Coal Age*, July, p 140).

Materials, supplies and priorities were the subject of Charles W. Connor, administrator, Defense Solid Fuels Administration. His assistant, G. Don Sullivan, answered questions following Mr. Connor's address. Although the Controlled Materials Plan went into effect officially July 1, it was predicted that it will not become fully effective until after the third quarter. DSFA now is authorized to accept applications for construction for production facilities only. Any structure requiring 25 tons of steel—salvage or new—requires a permit. Preparation plants planned months ago, for which some of the fabricated steel already is on the ground but for which ground clearing or foundation construction was not started by May 15, now may not be erected until a permit is issued, it was revealed.

A diesel locomotive for underground use built by the National Mine Service Co. was described by R. H. Magee, vice president of that company. It was the first to be approved as permissible by the U.S. Bureau of Mines (*Coal Age*, June, p 128). Mr. Magee said resistance to the use of diesels underground comes from the fact that few people know that the diesel is different from the gas engine, in that a diesel built to permissible specifications emits no offensive oil fumes and produces only a negligible amount of carbon monoxide. Diesel trucks and buses, on which most people base their opinions, use a fuel ratio of about 16 to 1 while a permissible diesel has the ratio permanently fixed at 20 to 1.

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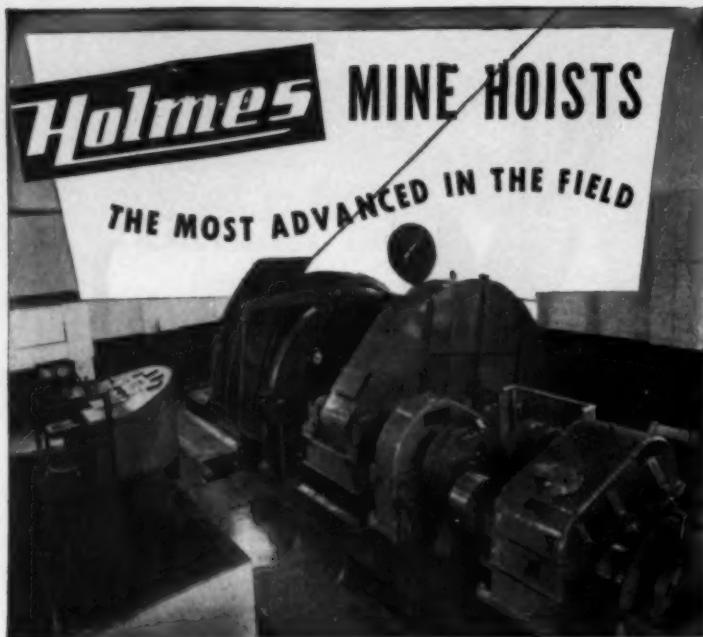
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West Virginia Meeting

underground use. Considering elimination of the overhead trolley line, Mr. Magee concluded: "Certainly diesel locomotives are more safe than trolley type." Answering questions, he said that "at the moment" the price on the 10-ton locomotive is \$22,000 and that two such locomotives can be operated in tandem by one operator.

BCR continuous-mining developments were described by Gerald von Stroh, director, Mining Development Committee, and several of his assistants. S. Lee Shepard, business manager, described a survey which emphasized the need for reducing direct mining costs. Vincent Callison, design engineer, told about development of the BCR test machine and experiments with metal conveyor belts and said that there is under development a permissible fluorescent lighting fixture. J. J. France, design engineer, described development of the six-point rotary cutter bit and experiments with thinner hard-surface coatings. H. E. Smith, face transportation development engineer, told of experiments with the stainless-steel strip shaker conveyor (*Coal Age*, April, p. 81).

Replacing locomotive sand with a low-silica substitute, which was one of the specific recommendations in a paper, "The Silicosis Problem—Its Seriousness and Possible Methods of Control," presented by William F. Eckert, Pickands Mather & Co., evoked considerable discussion. One coal-mining executive said he believes that the high incidence of silicosis in mines of his company is caused by track sand.

Edwin J. Johnson, manager, mining tool division, Kennametal, Inc., said that within 100 miles of Bluefield there are two companies which could furnish feldspar sand, which is very low in free silica. One is Carolina Minerals, Ashley, Va., and the other Dominion Minerals, Piney River, Va. Feldspar is not quite as sharp as ordinary sand but the Hudson Coal Co. has found it satisfactory for locomotives. In his paper Mr. Eckert said that a few mines in Pennsylvania are using iron-ore tailings from Mt. Lyon, N. Y., and that this material has less than 10% free silica compared to 90% in ordinary locomotive sand.

A threshold of 50 m.p.p.c.f. was suggested for coal dust. Recommendations to allay coal dust included water spraying on the face while sumping, during cutting, after blasting and during loading. Respirators should not be relied upon and wet drilling of rock should be mandatory. Rock drilling should be done with carbide insert bits because sharper bits have a chipping action that causes less dust. The opinion was expressed that while uncomplicated silicosis is not disabling, complicated silicosis in the early stages is dangerous.

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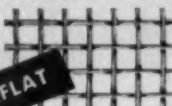
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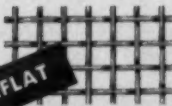
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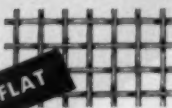
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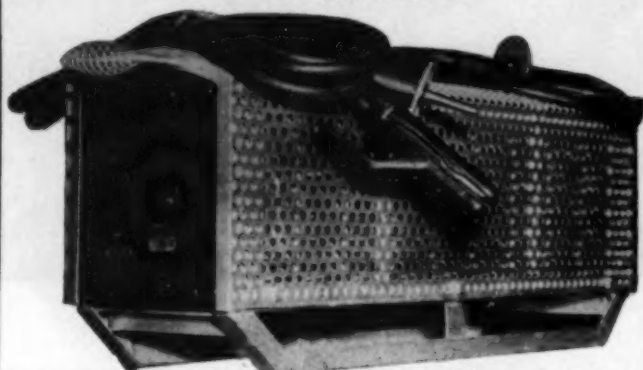
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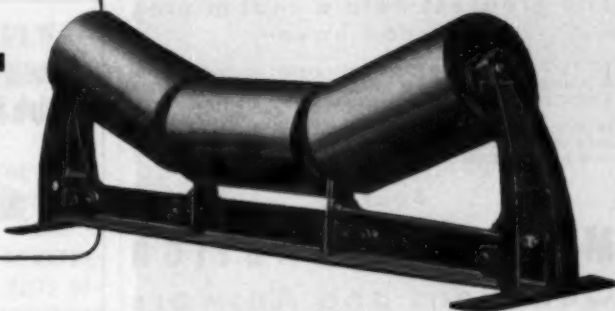
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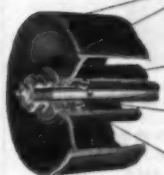
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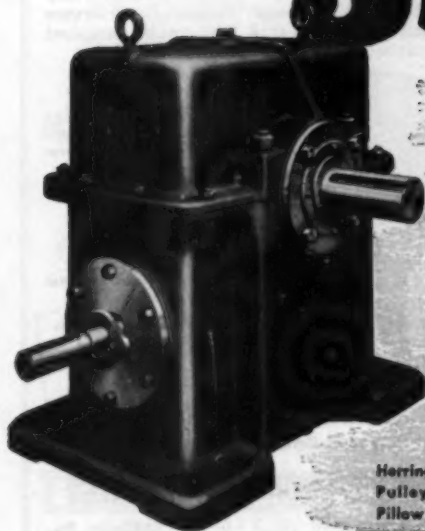
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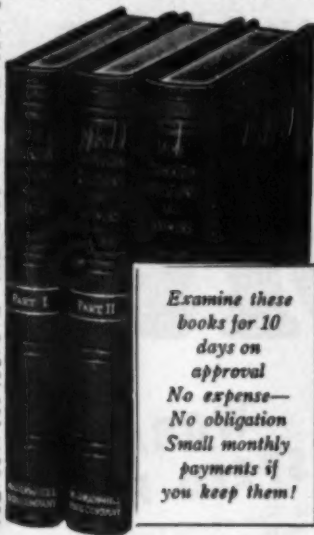
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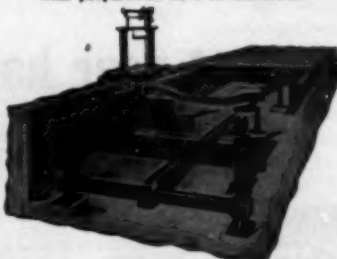
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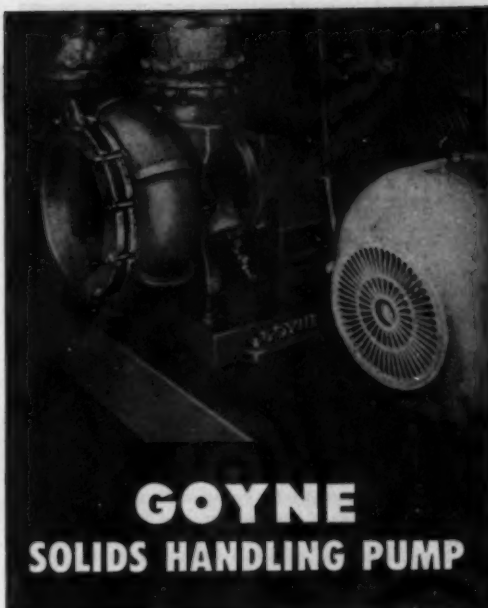
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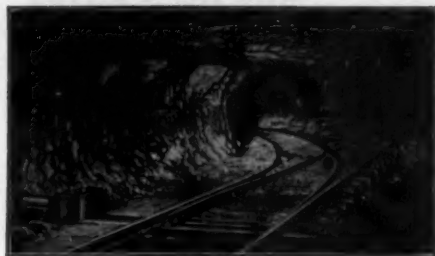


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100	West.	900	Syn.	Syn.
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14"	4	1/16"	1/32"	1/32"	28 Oz.
16"	4	1/8"	1/32"	1/32"	28 Oz.
18"	4	1/8"	1/32"	1/32"	28 Oz.
20"	4	1/8"	1/32"	1/32"	28 Oz.
22"	4	1/8"	1/32"	1/32"	28 Oz.
24"	4	1/8"	1/32"	1/32"	28 Oz.
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32"	4	1/8"	1/32"	1/32"	28 Oz.
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36"	4	1/8"	1/32"	1/32"	28 Oz.
38"	4	1/8"	1/32"	1/32"	28 Oz.
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LIQUIDATING MINE NO. 3, KISKI VALLEY COAL COMPANY APOLLO, PENNSYLVANIA

2-350 KW GENERAL ELECTRIC Motor Generator Sets 275 V. 1200 RPM. 2300 V.
3 Ph., 60 Cy. One Full Automatic and One Semi-Automatic Switchgear.
1-13 Ton (Practically New) JEFFREY 250 V. 2-MH-2154 Motors, 36" Ga.
1-8 Ton JEFFREY 250 V. 2-MH-100 Motors, 42x36" Ga. Motor Driven Reels.
1-6 Ton JEFFREY 250 V. 2-MH-95 Motors, 42x36" Ga. Motor Driven Reels.
1-6 Ton GENERAL ELECTRIC (Low Type) 250 V. 2-MH-823 Motors, 42x36" Ga.

1-512 GOODMAN (Late Type) Shortwall 50 HP. 250 V. 9' Cutter Bar with Cable.
1-12-A GOODMAN 250 V. 7' Cutter Bar with Truck and Cable.
1-7B SULLIVAN 250 V. 7' Cutter Bar with Truck and Cable.
1-CE-7 SULLIVAN 250 V. 6' Cutter Bar with Truck and Cable.
2-CL-15 GOODMAN Shaker Conveyors, 300' Pan Line, Duck Bills, Elev. Conveyors.
1-JEFFREY Bottom Retarding Conveyor, 491' Center.

(In addition to the above there are a number of Room Hoists, Pumps, Transformers, and Miscellaneous Mine Supplies)

MOORHEAD ELECTRICAL MACHINERY COMPANY
Oakdale, Pennsylvania
Pittsburgh Telephone
Walnut T-4300

WALLACE E. KIRK COMPANY
502 Grant Building
Pittsburgh 19, Pennsylvania
Court 1-0123

LIQUIDATORS

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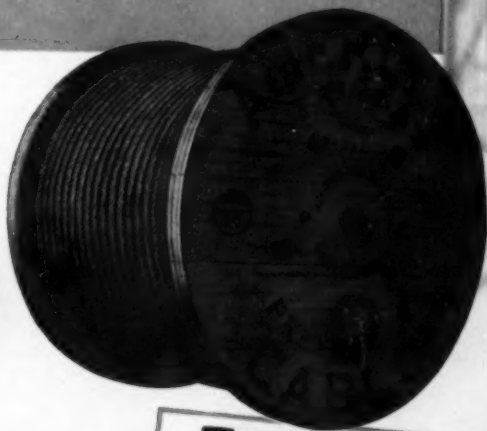
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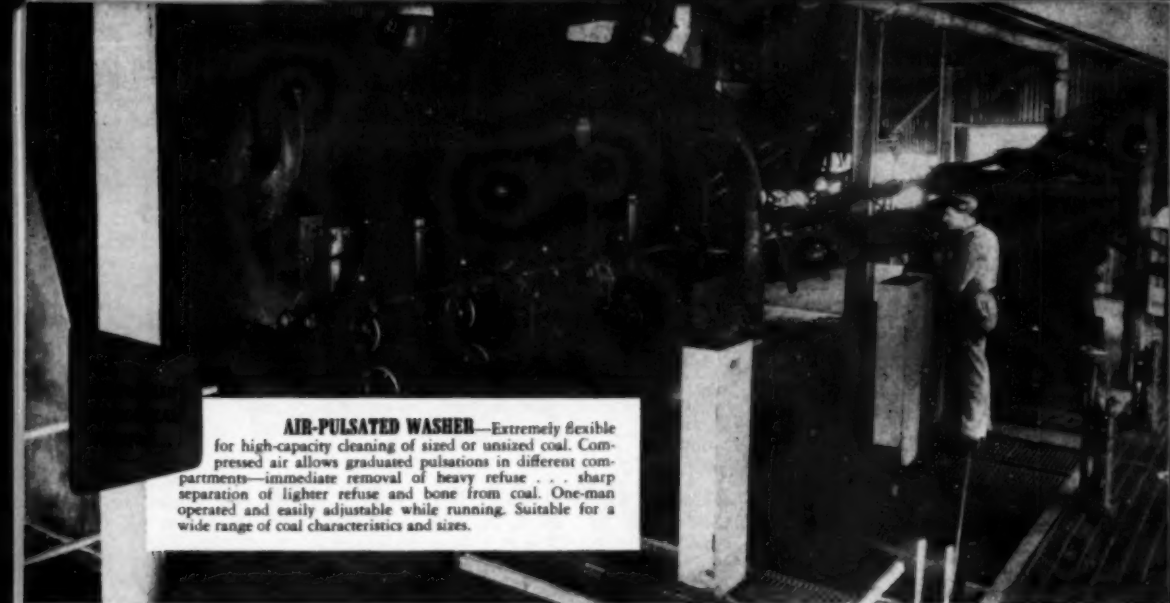
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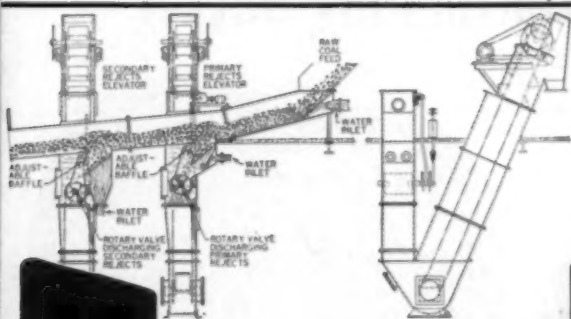
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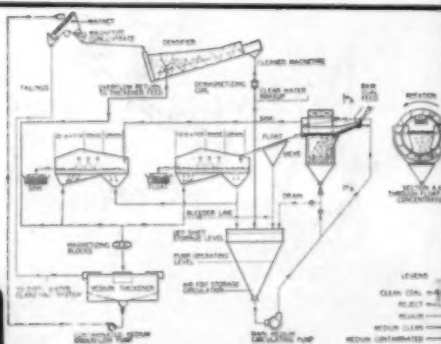
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FLOAT-SINK CONCENTRATOR — Latest advance in coal cleaning—utilizes Heavy-Media* separation process. Efficient for extremely high or low specific gravity separation . . . when a large percentage of coal is near the separation gravity . . . when amount of impurities in feed fluctuates or product must be quickly changed. Cleans larger sizes, reducing necessity for manual picking.

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COAL PREPARATION and
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